Understanding conflictive dynamics within [wind] energy planning, the Mexican case

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‘‘tenemos raíces en las nubes, pero ellas son fieles al viento”

Natalia Toledo

Abstract

Wind is one of the renewable energy sources with more progress and great investment worldwide in the last decades. Despite the overall assumption of positive opinion and remarkable growing targets, wind energy presents some controversies at the local setting, which are mainly social and ecological concerns, a clear evidence of the struggles surrounding renewable energies in general and declining public acceptance. Furthermore, local opposition and social impacts challenge a sustainable path of the growing wind energy development. The general hypothesis of this dissertation is that public participation shortcomings determines and have direct influence on how social impacts are shaped at the local level. While the impacts evaluation of wind energy often focuses mainly on environmental and economic aspects, there are social implications of wind power deployment that are crucial to be addressed, especially in many emerging regions of the world.

In order to explain the narrow relationship between public participation shortcomings and social conflicts within wind energy projects planning, this dissertation aims to analyze the social implications at the local setting of the wind energy development and its assessment, with a primary focus on disadvantaged regions. The case study of the rapid wind energy hub in the Isthmus of Tehuantepec, in Oaxaca, Mexico, provides rational findings and contextualizes how top down planning and a vertical decision-making approach, ironically based on international climate policies, has created negative social impacts at the local context and upper levels, mainly set off by public participation shortcomings. Firstly, it shapes a conflictive dynamic between the local communities and a strong opposition (mostly from indigenous peoples) to further wind energy development in the region. Additionally, the single case study of fossil energy shows similar findings in regard such public participation weaknesses pattern within large scale projects in the country. Hence, this research work might contribute to building further analysis at the regional and national levels, as well as in another regions or countries with similar development patterns.

The analytical and empirical analysis of this dissertation give deep insight outcomes on: 1) the suggestion of four general classifications of social impacts of wind energy (socio-environmental, socio-economical, socio-cultural, and stakeholders' engagement); 2); the identification of social and environmental issues in the region of the Isthmus of Tehuantepec, emphasizing the relevance of a proper assessment; and 3) the recommendation of integrating a

more significant public participation (including indigenous communities) through an iterative process model within the EIA, and SIA legal framework in the country. Based on our results and discussion, EIA performed limited public participation, which was further constricted with respect to indigenous participation, also did not consider fundamental socio-cultural implications within fossil and wind energy planning. Addressing cumulative effects also in the social context seems to be a great challenge in a short and long-term.

Finally, based on the findings and discussion of this dissertation, an overall conclusion is that public participation shortcomings are shaping social issues and conflicts of wind energy development at the local level, and since EIA is focused on environmental matters, the impact assessment of social issues has been addressed superficially. EIA and SIA need to be improved in regard to proper and earlier social implications assessment of fossil and renewable energy projects. A point of convergence is the role of international organizations in the local setting, as well as governance at different level (national, regional, and local).

Furthermore, this PhD work identified different further research for the Mexican case, such as improving the institutional setting and appropriate planning instruments for social and environmental issues evaluation, effective public participation mechanisms within the legal framework of EIA, SIA, and indigenous consultations in energy projects, and finally, potential addition of community renewable energy schemes. In general, even when there is still a limited research on experiences within indigenous communities and renewable energy projects, it is recommended cautiousness and essentially respect in such cases, assisting in empowering communities to decide their own processes. Even though, the results of this research cannot be generalized, they can broaden the research in the Global South as well as in the Global North.

Zusammenfassung

Die Windenergie ist eine der erneuerbaren Energiequellen, die in den letzten Jahrzehnten weltweit mehr Fortschritte gemacht hat und hat große Investitionen erfahren. Trotz der ambitionierten Ausbauziele und der positiven Einstellung der Öffentlichkeit gegenüber der Windenergie, ist ihr Ausbau mit diversen Kontroversen auf lokaler Ebene verbunden. Dies betrifft vor allem soziale und ökologische Belange und ist ein Beispiel für die sinkende Akzeptanz der erneuerbaren Energie in der Öffentlichkeit. Trotz eines positiven Erscheinungsbildes und bemerkenswerter Wachstumsziele ist die Windenergie mit einigen Kontroversen verbunden in die lokale Ebene, die vor allem soziale und ökologische Belange betreffen. Ein klarer Beweis für die Kämpfe um erneuerbare Energien im Allgemeinen und die sinkende Akzeptanz in der Öffentlichkeit. Darüber hinaus stellen der lokale Widerstand und die negativen sozialen Auswirkungen eine Herausforderung für nachhaltige Wachstum des Windenergieausbaus. Die zentrale Hypothese dieser Dissertation ist, dass Defizite in der Öffentlichkeitsbeteiligung einen direkten Einfluss darauf haben, welche soziale Auswirkungen auf lokaler Ebene haben. Während sich die Bewertung der Auswirkungen der Windenergie oft hauptsächlich auf ökologische und wirtschaftliche Aspekte konzentriert, gibt es soziale Auswirkungen der Windenergienutzung, die insbesondere in vielen Schwellenregionen - unbedingt berücksichtigt werden müssen.

Um den engen Zusammenhang zwischen mangelnder Öffentlichkeitsbeteiligung und sozialen Konflikten bei der Planung von Windenergieprojekten zu erklären, sollen in dieser Dissertation die sozialen Auswirkungen im lokalen Umfeld der Windenergieentwicklung und ihrer Prüfungen analysiert werden, wobei der Schwerpunkt auf benachteiligten Regionen liegt. Die Fallstudie aus dem Windenergie-Hotspot im Isthmus von Tehuantepec in Oaxaca, Mexiko, liefert empirische Erkenntnisse, wie eine Top-Down-Planung und ein vertikaler Entscheidungsansatz (der ironischerweise auf der internationalen Klimapolitik basiert) auf lokaler und allen übergeordnete Ebenen negative soziale Auswirkungen hervorgerufen hat, die hauptsächlich durch Defizite bei der Öffentlichkeitsbeteiligung verursacht werden. In ohnehin schon durch diverse lokale Auseinandersetzungen geprägten Regionen führt der Ausbau von Windenergie zur Zuspitzung von Konflikten zwischen lokalen Gemeinschaften und indigener Bevölkerung. Zunächst führt das unter der lokalen Bevölkerung zu einer widersprüchlichen Dynamik und einer starken Opposition (hauptsächlich von indigenen Völkern) gegen die weitere Entwicklung der Windenergie in der Region. Darüber hinaus zeigt die Einzelfallstudie über fossile Energieträger ähnliche Ergebnisse in Bezug auf solche Schwächen der

Öffentlichkeitsbeteiligung bei Großprojekten im Land. Daher könnte diese Forschungsarbeit zur Erstellung weiterer Analysen auf regionaler und nationaler Ebene sowie in anderen Regionen oder Ländern mit ähnlichen Entwicklungsmustern beitragen.

Die analytische und empirische Analyse dieser Dissertation gibt Einblicke in die folgenden drei Ergebnisse: 1) die Anregung von vier allgemeinen Klassifikationen der sozialen Auswirkungen des Windenergieausbaus (sozio-ökologische, sozio-ökonomische, sozio-kulturelle und Einbeziehung von Interessengruppen); 2) die Identifizierung sozialer und ökologischer Fragen in der Region des Isthmus von Tehuantepec, wobei die Relevanz einer ordnungsgemäßen Prüfung betont wird; und 3) die Empfehlung, eine fairer Beteiligung der Öffentlichkeit (einschließlich indigener Gemeinschaften) durch ein iteratives Prozessmodell in die UVP und den rechtlichen Rahmen für die Nachhaltigkeitsprüfung im Land zu integrieren. Auf der Grundlage meiner Ergebnisse belegen, dass in Rahmen e der UVP eine begrenzte Öffentlichkeitsbeteiligung durchgeführt wurde, die im Hinblick auf die Beteiligung indigener Bevölkerungsgruppen weiter eingeschränkt war und auch grundlegende soziokulturelle Implikationen bei der Planung fossiler und Windenergie nicht berücksichtigte. Der Umgang mit kumulativen Effekten im sozialen Kontext scheint kurz- und langfristig eine große Herausforderung zu sein.

Aus den Ergebnissen dieser Dissertation ergibt sich schließlich die allgemeine Schlussfolgerung, dass einerseits lokale soziale Fragen und Konflikte bei der Entwicklung der Windenergie durch Defizite bei der Öffentlichkeitsbeteiligung geprägt werden. Andererseits, da sich die UVP auf Umweltfragen konzentriert, wurde die Folgenabschätzung bei sozialen Fragen nur oberflächlich behandelt. UVP und SIA müssen im Hinblick auf eine ordnungsgemäße und frühere Prüfung der sozialen Auswirkungen von Projekten im Bereich fossiler und erneuerbarer Energien verbessert werden. Ein Punkt der Konvergenz ist die Rolle der internationalen Organisationen im lokalen Umfeld sowie die Regierungsführung auf verschiedenen Ebenen (national, regional und lokal).

Darüber hinaus wurden im Rahmen dieser Dissertation verschiedene weitere Forschungsbedarfe für Mexico identifiziert, wie z.B. die Verbesserung des institutionellen Rahmens und geeigneter Planungsinstrumente für die Bewertung sozialer und ökologischer Fragen, wirksame Mechanismen für die Öffentlichkeitsbeteiligung im rechtlichen Rahmen von UVP, SIA und Konsultationen von Indigener Bevölkerung beim Ausbau Energieprojekten und schließlich die mögliche Ergänzung gemeinschaftlicher Programme für erneuerbare Energien. Bisher gibt es wenig Forschung zum Ausbau Erneuerbarer Energien in indigenen Gemeinden

und dennoch wird in den bestehenden Arbeiten empfohlen mit Vorsicht und insbesondere Respekt vorzugehen, um die Gemeinden in die Lage zu versetzen, über ihre eigenen Entwicklungsprozesse und über die eigene Forschung entscheiden zu können. Auch wenn die Ergebnisse dieser Arbeit nicht verallgemeinert werden können, so können sie doch die Forschung sowohl im Globalen Süden als auch im Globalen Norden erweitern

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List of Abbreviations

AMDEE	Asociación Mexicana de Energía Eólica
CA	Constellation Analysis
CDM	Clean Development Mechanism
EIA	Environmental Impact Assessment
ILO-C169	International Labor Organization Convention
NIMBY	Not in my Backyard
SENER	Secretariat of Energy
SIA	Social Impact Assessment
SWOT	Strengths, Weaknesses, Opportunities, and Threats
UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
UNECE	United Nations Economic Commission for Europe
UNFCCC	UN Framework Convention on Climate Change
WB	World Bank
WWEA	World Wind Energy Association

Chapter I

Introduction

The wind energy market has developed significantly worldwide due to considerable investment in recent decades. In order to promote the development of renewable projects, international climate policies have supported emerging countries targets through different financial mechanisms, such as the instruments developed through the UN Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol, the Clean Development Mechanism (CDM) (Paris Climate Change Conference 2015; Lloyd and Subbarao 2009; Lau et al. 2012). Latin America has emerged in the wind market, with Brazil as the growth leader, followed by Mexico and its rapid upward trend. Despite the importance in substituting fossil fuel combustion, renewable energy projects are accompanied with implementation difficulties as a result of negative social impacts in several countries (Stigka et al. 2014; Batel and Devine-Wright 2015; Huesca-Pérez et al. 2016)

Fundamental matters such as local economy, geographic conditions, culture, and public involvement must be thoroughly considered when planning a wind energy project. Identifying social and cultural aspects within an infrastructure project is a relevant issue. Environmental Impact Assessment (EIA) has been applied for wind energy deployment worldwide forecasting likely impacts. Despite analyzing human aspects within EIA, there are numerous social and cultural aspects that would be challenging to evaluate using EIA because social awareness is not the main objective (Esteves et al., 2012; Hanna et al., 2016). Social Impact Assessment (SIA) has emerged as an effective parallel tool to identify social issues within a project and its applicability is notable, especially for emerging countries. Early EIA and SIA can be important planning instruments and an integrated assessment could provide a wider and more profound framework of the variety of impact analysis, including not only environmental but also social and cultural aspects of developing a large-scale project.

Public participation in the decision-making process of planning has become increasingly valuable at the global context and a good practice of EIA and SIA involves an early

participatory process. Public participation is essential in EIA and it is currently mandatory in most of the environmental licensing around the world (Noble, 2015). In regard to SIA, public involvement is an integral part of the process which should occur at earlier stages of the planning process (Barrow, 2000). In emerging countries, EIA presents several weaknesses regarding public participation mechanisms, especially when the project meets indigenous communities; moreover, it shows limited public contribution to the EIA process (Arnold & Hanna, 2017).

There are many social issues derived from wind energy diffusion which need to be carefully considered, especially when implementing plans in a deprived region such as the one in the Isthmus of Tehuantepec, Oaxaca, in Mexico. This area is identified as one of the highest potential wind energy regions in the world, but it is located in one of the poorest states in the country with a large indigenous population. Wind energy development in Mexico has been complex and contentious. The rapid increase of top-down planning wind parks in the Isthmus of Tehuantepec has created several conflicts between the local communities and a strong opposition (mostly from indigenous peoples) to future wind energy development in the region. Important factors come into play in the social impact assessment of wind energy. One of the main controversies observed in this body of research is the narrow relationship between public participation shortcomings and social conflicts within project planning.

1.1.Social aspects of the wind energy

There are a great amount of academic and technical papers concerning problems related to social acceptance at the local level in wind energy projects. From the literature review and empirical results, it becomes clear that information, consultation, and active participation are key elements to the success and acceptance of further wind energy projects.

While there is an overall assumption of positive opinion to wind energy and impressive development targets, acceptance at the local level and the institutional setting are increasing challenges for wind energy diffusion (Agterbosch et al., 2009; Gartman et al., 2014). Planning and siting dimensions are considered a limiting factor in the social context, moreover, when there is multi-level governance decision-making, which is especially important in emerging countries where wind energy deployment can push local and regional development (Brown, 2011; Gartman et al., 2014).

Social impact is understood as the adaptation of a social system to environmental, economic, and cultural changes, modifying the relationships within community (Barrow, 2000). Based on literature review, this work suggested a classification of the social issues related to wind energy deployment: socio-environmental (landscape, noise, shadow flickering); socio-economic (employment and local economic development; ownership, lease agreements, property tax and compensations; economic chains and interference); socio-cultural (socio-cultural values, indigenous people's rights); and stakeholder engagement (information, consultation and participation). A more detailed review can be seen in chapter II.

The social dimension of impacts involves all probable impacts to people´s wellbeing, including surrounding environment, land, community, livelihoods, and particularly local culture (Smyth & Vanclay, 2017). There are measurable socio-environmental impacts of wind energy, such as noise pollution as a disturbance to human health (Henningsson & et al, 2013), or landscape deterioration (Nadaï & Labussière, 2013). However, numerous social issues are challenging to address in a single EIA, such as the socio-cultural dimension, the tangible (archeological sites) and intangible (sacred sites, language, art) culture of indigenous communities, for example. Impact assessment of social issues has often been treated in a superficial way, called human factors, and presenting, for example, geographic and demographic data of the region to be affected by the project.

1.2. Public participation in wind energy planning

Public attitudes towards wind parks vary across countries and regions. Several studies showed that public support for wind parks increases when there is community participation in the planning process (Hoffman & High-Pippert, 2010; Swofford & Slattery, 2010). Dissemination of information is as fundamental for social acceptance, as much as consultation, participation, and proper considerations regarding ownership of the wind parks (Corscadden et al., 2012; Gross, 2007; Jobert et al., 2007). International financing institutions (Inter-American Development Bank, World Bank) require promoting social sustainability for financing projects and enhancing the process of information, consultation, and participation (Jobert et al., 2007).

Overall, public participation may be defined as a process of involvement from either individuals or groups of individuals that are likely to be positively or negatively affected by a proposed intervention or take an interest in it (André et al., 2006). In impact assessment, levels of participation vary from passive participation (receiving information), to consultation (public hearings) and interactive participation (workshops, negotiation) in the different stages of the

process (from initial community analysis to approval decision-making, monitoring, and follow-up). At an international level, different legal frameworks exist for public participation, namely the 1997 Espoo Convention on Environmental Impact Assessment in a Transboundary Context (United Nations Economic Commission for Europe [UNECE], 2015), and the Aarhus Convention 1998 - Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (United Nations Economic Commission for Europe [UNECE], 1999). The adoption of the Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean in September 2018, known as the Escazú Agreement, is a significant step for environmental human rights and environmental democracy in Latin America (CEPAL, 2018).

The good practice of involving the public in the decision-making process of planning has become increasingly beneficial and is noted as essential to EIA and SIA, specifically when it is integrated in the planning process at earlier stages (Barrow, 2000; Noble, 2015). Nevertheless, there is inadequate public contribution to the EIA process, especially in emerging countries, where there are several shortcomings in public participation mechanisms, and even more when including indigenous communities (Arnold & Hanna, 2017).

The UN declaration on the rights of indigenous people sets out the individual and collective rights of indigenous peoples, as well as their rights to culture, identity, language, employment, health and education, and the right to maintain and strengthen their own institutions, cultures and traditions, and to pursue their development in keeping with their own needs (United Nations Declaration on the Rights of Indigenous Peoples UNDRIP, 2007). There are different international agreements which address indigenous rights. The fundamental one is the Indigenous and Tribal Peoples Convention, International Labor Organization Convention 169 (ILO-C169), in 1957 and last revision in 1989, which legally promote the rights and recognition of indigenous peoples. The core of this convention is that governments are required to consult indigenous peoples on issues that affect them and to guarantee the principles of consultation and participation in public life (Hanna & Vanclay, 2013; International Labour Organization (ILO), 2009). To date, 23 countries have signed the ILO-C169, most of them Latin-American countries (International Labour Organization (ILO), 2018).

In different parts of the world, cases can be observed where social impacts generated from wind energy projects, many of which are planned on indigenous land. There are demonstrations

of public resistance in United States of America, Scotland, and Mexico (Pasqualetti, 2011), growing opposition and inequalities in northeastern Brazil (Brown, 2011; Garcia Santos, 2012), and human rights violation in Panama (Finley-Brook & Thomas, 2011). In contrast, positive examples, such as in the province of Nova Scotia in Canada, which demonstrate inclusion of indigenous peoples rights in wind energy projects are inadequately proportioned (CMM Environmental Studies, 2008; Corscadden et al., 2012).

Therefore, a narrow relationship between public participation shortcomings and social conflicts or opposition to wind energy projects is observed. There are several studies that show that public support for wind farms increases when there is community participation in the planning process (Hoffman & High-Pippert, 2010; Swofford & Slattery, 2010). Odparlik & Köppel (2013) state that in general, access to Environmental Impact Assessment (EIA) documents is a basic tool for providing information within permitting processes. Likewise, dissemination of information is fundamental for social acceptance along with identifying information and participation as factors for local acceptance, and further considerations regarding ownership of the wind parks (Jobert et al., 2007). Empirical research in Australia considers that the lacks of prior and clear information, as well as inappropriate participation within the community are perceived as a lack of fairness, which reduces legitimacy of the project (Gross, 2007). Another study on community wind parks in Canada shows the importance of quality of consultation and early communication for increasing social acceptance and reducing conflicts (Corscadden et al., 2012).

1.3. State of research of the wind energy development in Mexico and its local impact

Wind energy has experienced a major development in the last decades. By the end of 2019, wind capacity reached 651 GW worldwide (WWEA, 2020). It is expected that the wind industry will face a strong slowdown in 2020 due mainly to the current corona virus crisis. While US and China are still the world leaders, the European wind growth were on a decline, and Latin America has become an emerging wind market mainly because of Brazil´s leadership growth (15,5 Gigawatt total), followed by Mexico´s upward trend (6,2 GW) (IRENA, 2018; WWEA, 2020).

The costs of wind energy fell in 2017 due to technological innovations and changes in markets and policies. In Mexico, the prices bid for onshore wind power came down to about 30 USD

per MWh. Mexican wind energy holds a world record low and dropped 40-50% relative to Mexico's tenders in 2016, while a Mexican tender late in the year saw prices below 20 USD per MWh (REN21, 2018) . This trend of being the cheapest wind energy globally made Mexico an attractive and profitable market for investors from all around the world. By the end of 2019, Mexico's wind capacity reached 6,3 GW; alone Oaxaca's capacity was 2,76 GW. The national capacity is expected to triple by 2024 (AMDEE, 2020).

Most of the renewable energy projects in Mexico have been financed by the CDM. In regard to wind energy, 29 wind projects settled under this policy by mid-2018, 20 of which are located in the Oaxaca State (CDM, 2018). In 2018, this state registered the largest expansion on wind energy in the country, with a growth of 600% in the last decade (Forbes, 2018). There is a considerable amount of criticism on the CDM implementation projects and the effectiveness of the instrument (Benecke 2009; Lederer 2011; Böhm et al. 2012; Corbera and Jover 2012; Ervine 2013; Phillips and Newell 2013; Gartman et al. 2014; Reinecke et al. 2014). For example, in consideration of transfer of technology, while countries like India or China have taken advantage of this knowledge and became world leaders in wind energy; Mexico, on the contrary, has no domestic wind industry (Gartman et al., 2014) making it dependent of imports market with unequal conditions. Mexico is an example where a top-down (wind) energy planning and vertical decision making can trigger negative effects.

Wind energy deployment in Mexico has been controversial from the very beginning. Due to the considerable wind power potential, the majority of Mexico's wind generation has been developed in in the Isthmus of Tehuantepec. The rapid wind energy growth in this region of the Oaxaca State has created diverse social conflicts, deepened inequalities and triggered many conflicts (Jorge LLaguno, 2014; Juárez-Hernández & León, 2014; Nahmad-Sitton, 2011). Oaxaca is the second Mexican state with the lowest index of development and highest poverty levels in the country, and with half of the state´s population with an indigenous background (Huesca-Pérez et al. 2016). Despite the fact that wind energy has promoted investment in the state of Oaxaca, local opposition and social conflicts within indigenous communities are the central issues of the renewable energy narrative in the area. An analysis and categorization of the socio-environmental implications of siting wind energy in such a disadvantaged region is listed in Chapter II.

1.4. New research on social and environmental concerns surrounding renewables: assessing the research impact of this dissertation

There is a considerable amount of new research regarding social impacts of wind energy and renewables in general, confirming many major results of this research work. This subchapter identifies other authors mentioning the published papers of this dissertation. The review paper called ***Social implications of siting wind energy in a disadvantaged region – The case of the Isthmus of Tehuantepec, Mexico*** has 84 citations in Google Scholar to the date of 21st Februar 2022, which includes scientific articles in international journals as well as grey literature (thesis, working papers, etc.). Table 1 in Annex A enumerates the most relevant work selected for the outcome of this dissertation.

The struggles surrounding renewable energies are growing worldwide, and public acceptance in general is a hindering aspect for a successfully wind energy implementation. The social implications are the main focus of the listed documents. For example, concurring with this research work, Wingenbach, 2018) considered that a proper assessment of socio-ecological concerns when planning and implementing wind energy could raise public acceptance. Many authors citing me coincide with the strong relation between public acceptance of wind energy and justice as a factor of increasing risk of local conflicts. For instance, distributional justice with an international perspective, in Ethiopia, Canada, and Latin America, such as distribution and access to benefits, ownership schemes, among others (Frate et al., 2019; Rand & Hoen, 2017; Wiese, 2020); energy justice within indigenous opposition to large scale projects i.e. in Canada (Walker et al., 2019); and, social justice in terms of the Mexican political and institutional settings (Friede & Lehmann, 2016; Lehmann, 2018a; Martinez, 2020; May et al., 2017; Mejía-Montero et al., 2020).

Some documents citing my research so far have reported unfair implementation processes of renewable energies (specially wind) in disadvantaged regions in the Global South, mostly in Brazil and Mexico; where the locals have not been engaged within the planning process (Backhouse & Lehmann, 2020; de Azevedo Dantas et al., 2019; Frate et al., 2019; Gorayeb et al., 2018; Rand & Hoen, 2017; Wiese, 2020).

The particular case of the Isthmus of Tehuantepec has been obviously worth an extensive analysis based on its narrative of political conflicts and social inequalities. Many citing authors agreed with the following statements:

- indigenous opposition and the unsuccessful institutional response and environmental governance (Hafeznia et al., 2017; Zárate-Toledo et al., 2019; Zárate Toledo & Fraga, 2016);
- erroneous process of access to information, participation and consultation (Pérez-Denicia et al., 2017; Zárate-Toledo et al., 2019);
- struggles over community and indigenous land and disconnected multi-level decision making (Corbera et al., 2017; Friede & Lehmann, 2016; Lehmann, 2018b; Zárate-Toledo et al., 2019);
- a top-down wind energy planning and decision making, mostly based on international agreements (Garcia Feria, 2018; Lehmann, 2018a; Zárate-Toledo et al., 2019), and unintentional and undesirable local impacts of CDM projects (Corbera et al., 2017);
- when it refers to socio-ecological concerns from the locals, there is a need of an analysis from the social sciences, and with participatory methodologies (Friede & Lehmann, 2016; Fuentes-Cortés et al., 2019; Hanssen et al., 2018; Mercer et al., 2020);
- EIA licensing seen just as a bureaucratic procedure, and without meaningful participation, created more conflicts within the communities instead of promoting public participation and therefore justice (Frate et al., 2019; Gorayeb et al., 2018);
- the recent recognition from the Mexican government of such social impacts; with the legal establishment of the compulsory SIA and an indigenous consultation within some projects, triggered a debate in terms of social-ecological concerns and public participation. Yet, this strategy is still in progress. The prior consultation is only for indigenous peoples, while other groups have no guarantee of involvement (Zárate-Toledo et al., 2019).

Likewise, other authors mentioning this investigation, considered that in such case of complex stakeholders' dynamic relationships, it is worth a participative analysis (in terms of the Constellation Analysis) to approach a better dialog in decision making processes (Fuentes-Cortés et al., 2019; Hanssen et al., 2018).

Overall, this dissertation aims to contribute to raise awareness of the social dimension of the renewable energies production and emphasizes the relevance of earlier assessments of social implications to projects within a participative approach. It is clear that the process of information, consultation, and participation are key not only regarding local acceptance of the wind energy, but also, in the analysis of environmental and social impacts.

1.5. Research rationale and research questions

The main goal of this dissertation is the analysis of the social implications of wind energy, with a special focus on disadvantaged regions. In order to reach this goal, the case of the Isthmus of Tehuantepec, in Oaxaca, Mexico is thoroughly analyzed. The general hypothesis for this research work is that the level of public participation determines and has direct influence on how the social conflicts are shaped at the local setting. A predominant matter in social issues is the narrow relationship between public participation shortcomings and social conflicts within the wind energy projects planning.

Despite the promotion of local investment and national renewable energies targets, local acceptance and social conflicts are fundamental concerns. Beyond local acceptance and concepts like *Not in my Backyard* (NIMBY), several social and cultural issues are difficult to analyze. The social dimension of impacts is a wide spectrum of human-related aspects, which goes from individuals´ wellbeing and a healthy surrounding, local economy development, to community perceptions and cultural diversity. While the impact of wind power typically focuses on environmental and economic aspects, there are social implications of wind power deployment that are imperative to be addressed in many emerging regions of the world, including Mexico. There are numerous social and cultural impacts that cannot adequately be addressed through EIA alone. In pursuance of a deeper comprehension of such social aspects of wind energy and the relevance of a proper and earlier assessment, and considering our case studies, the following questions have arisen:

Question 1:

What are the social implications of wind energy, especially in disadvantaged regions?

Question 2:

How are the social issues of wind energy addressed within the EIA and SIA at an international level, and in our case studies?

Regarding public participation within EIA, SIA and indigenous consultation in Mexico, the single case study, and the respective analysis of the national legal framework was analysed to establish a better explanation of the public participation pattern. Hence, a final question is identified:

Question 3:

Which are the main strengths, weaknesses, opportunities and threats concerning the public participation in EIA, SIA, and indigenous consultation in Mexico, based on our case study?

Furthermore, an important common thread of this doctoral work is to explore the role of multi-level governance and regulatory institutions and instruments regarding public participation and social impacts in an environmental context.

1.6. Methodological approach

This section's aim is to provide general details of the methods used. In order to have empirical findings by utilizing interdisciplinary methodologies, Constellation Analysis (CA) (Schön 2007; Bruns et al. 2010), as well as Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis were performed on the case studies. Additionally, the application of the general guidelines of case study research (Yin, 2014) helped to outline the general framework. The data collection was done using systematic literature review, documents and regulation analysis, with a qualitative approach for data analysis and interpretation. Moreover, the use of semi structured interviews with relevant stakeholders (Longhurst, 2016), meetings, and methodological workshops regarding each of our case studies supplemented the analysis. The research methods are described in detailed in the following chapters, as for CA in chapter IV, and for SWOT analysis in chapter V.

For this research work, 21 semi-structured interviews, five focus group discussions, and five CA workshops were conducted. The data was collected during several field research trips to Mexico (March 2014, May 2015), where meetings, interviews and workshops were held to observe the cases from the field (see Table 2, Table 3, Table 4).

The chosen case studies (see Table 5) for this research were primarily concerned with wind energy. However, a single case of the extractive industry, Campo Malva in the Chiapas State, is also appraised in order to analyze the respective public participation proceedings. The grounds for analyzing this single case study were based on the conditions from Yin (2014): a) it represents a significant contribution in the public participation review within the EIA, SIA and the indigenous consultation; b) good access to public information, and well documented procedures; c) it is representative regarding public participation in a infrastructure project; d) it is indicative of what happens or could have happened in other similar projects in the current context; and finally, e) the project was cancelled due to the opposition from indigenous communities.

1.7. Scope of the research work

The scope of this dissertation is firstly to validate the general hypothesis, which argues a close relationship and influence of level of public participation and social impacts at the local level. Secondly, to have a deep overview of the social implications at the local setting of the wind energy development and its assessment, with a primary focus on emerging countries and disadvantaged regions. The case study of Mexican wind energy development hub provides rational findings and help to understand how public participation shortcomings set off social impacts at the local context. While the impacts evaluation of wind energy often focuses mainly on environmental and economic aspects, there are social implications of wind power deployment that are crucial to be addressed, especially in many emerging regions of the world.

The chosen case studies reveal a relevant panorama of what is happening in the field of wind energy planning, environmental planning and respective social issues and public participation performance in Mexico, with revelatory findings along different units of analysis. Although this is not a massive analysis of diverse case studies, the study sample clearly proved to be representative and the unique case gave a clear precedent for a disadvantaged region, and the comprehensible consequences. Thus, it is a significant contribution to current knowledge.

1.8. Structure of the dissertation

The dissertation is composed of three core chapters, as well as the introduction and final outlook and overall conclusions chapters. Each of these chapters contains the statements from the respective research questions, including the main findings and contributions regarding the goal of this dissertation. The core chapters consist of the published articles in international peer-reviewed scientific journals; each of them was written as stand-alone manuscripts and presented in this dissertation with their respective *Author Contribution Statement*. The chapters' content is briefly introduced below:

Chapter 1 as the introductory section presents the status quo of the wind energy planning in Mexico, as well as the research rational and research questions of this PhD work.

Chapter 2 called "Social implications of siting wind energy in a disadvantaged region – The case of the Isthmus of Tehuantepec, Mexico" identify and propose a categorization of the social implications of planning wind energy in a deprived region, with the specific case of the Isthmus of Tehuantepec in Mexico.

Chapter 3 called "From global to local: Impact assessment and social implications related to wind energy projects in Oaxaca, Mexico" presents CA as qualitative analytical approach to identify social and environmental issues in our particular case studies, emphasizing the relevance of the prior assessment of such impacts of infrastructure projects.

Chapter 4 called "Public participation and free, prior and informed consultation in Mexico: the case of Campo Malva" analyzes the strengths, weaknesses, opportunities and threats of the participation processes in environmental assessments within a single case study with an environmental legislation base.

Chapter 5 presents the final outlook and overall conclusions of this doctoral work, by answering the research questions through the findings and results. Recommendations for future prospects in the topic, and the main contribution of this research work are exposed.

1.9. Overview of the selected publications

A general overview of the selected publications on international scientific journals is summarized in chronological order as follows:

Wind of Change or Wind of Challenges: Implementation factors regarding wind energy development, an international perspective

Citation:

Victoria Gartman, Kathrin Wichmann, Lea Bulling, **MARÍA ELENA HUESCA PÉREZ**, Johann Köppel (2014). Wind of Change or Wind of Challenges: Implementation factors regarding wind energy development, an international perspective. AIMS Energy, 2 (4), pp. 485-504.

Author Contribution Statement:

I was in charge of the section named social acceptance with the referred case study, as well as complementing the document with information regarding Mexico and CDM. The leading author was responsible of the concept of the draft paper. The additional authors gave content, acquisition and interpretation of data analysis in regards of the case studies.

Available online:

https://doi.org/10.3934/energy.2014.4.485

Status of the manuscript:

Published on 17 December 2014. The article is open access in the Journal AIMS Energy, Special Issue: Wind Power Implementation Challenges.

To be found in dissertation in Chapter II, pp. 15

Social implications of siting wind energy in a disadvantaged region – The case of the Isthmus of Tehuantepec, Mexico

Citation:

HUESCA PÉREZ MARÍA ELENA, Sheinbaum-Pardo Claudia, Köppel Johann (2016). Social implications of siting wind energy in a disadvantaged region – The case of the Isthmus of Tehuantepec, Mexico. Renewable and Sustainable Energy Reviews.; 58:952–965.

Author Contribution Statement:

As leading author, I have designed the concept of the draft paper, which includes conception and contents, as well as acquisition and interpretation of data. The additional authors gave feedback, substantial comments and important scientific content for the final version of the manuscript submitted to publication.

Available online:

https://www.sciencedirect.com/science/article/pii/S1364032115016937

Status of the manuscript:

Published on 15 January 2016.

To be found in dissertation in Chapter III, pp. 16

From global to local: Impact assessment and social implications related to wind energy projects in Oaxaca, Mexico

Citation:

HUESCA PÉREZ MARÍA ELENA, Claudia Sheinbaum-Pardo & Johann Köppel (2018) From global to local: impact assessment and social implications related to wind energy projects in Oaxaca, Mexico, Impact Assessment and Project Appraisal, 36:6, 479-493, DOI: 10.1080/14615517.2018.1506856

Author Contribution Statement:

As leading author, I have designed the concept of the draft paper, which includes conception and contents, as well as acquisition and interpretation of data. Also, I did the fieldwork in form of interviews, meetings and workshops. The additional authors gave feedback, substantial comments and important scientific content for the final version of the manuscript submitted to publication.

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Status of the manuscript:

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To be found in dissertation in Chapter IV, pp. 17

Participación pública y consulta libre, previa e informada en México: El caso de campo Malva

Citation:

HUESCA PÉREZ MARÍA ELENA, Anglés Hernández Marisol, Köppel Johann (2020/21). Participación pública y la consulta libre previa e informada en México: El caso de la industria de hidrocarburos, campo Malva

Author Contribution Statement:

As leading author, I have designed the concept of the draft paper, which includes conception and contents, as well as acquisition and interpretation of data. The additional authors gave feedback, substantial comments and important scientific content for the final version of the manuscript to be submitted for publication.

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https://archivos.juridicas.unam.mx/www/bjv/libros/14/6573/7.pdf

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To be found in dissertation in Chapter V. pp. 18

Chapter II

Wind of change or Wind of Challenges: Implementation factors regarding wind energy development, an international perspective

Publication No. 1

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Review

Wind of Change or Wind of Challenges: Implementation factors regarding wind energy development, an international perspective

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Abstract: Countries promoting renewable energies encounter a variety of phenomena that can challenge the implementation of further onshore wind energy development. Those challenges can be observed in many multi-level governance systems, as exhibited in the U.S., Germany, and Mexico, where various regulatory and institutional levels must agree on goals and responsibilities. This is a challenge, as both forms of governance (top-down and bottom-up dominated) are present in wind energy planning and policy. (1) Political and market phenomena, (2) siting issues, (3) the green vs. green dilemma, and (4) social acceptance are selected challenges within the different levels of decision-making processes in wind energy implementation. (1) Political and financial factors can influence the development by implementing incentive- and market-based policies, command-and-control policies, and feed-in tariffs. However, success of these policy designs for renewable energies is based on different political environments, and their electricity markets nationally, regionally, or statewide. (2) Spatial limitations in planning are created based on limited land availability due to conflicts with other land uses such as aviation, nature reserves, residential areas, their respective buffers. (3) The "green vs. green" dilemma involves the incoherent relationship between policies promoting renewable energies with policies protection species and their environments, becoming a major point of concern during siting and operations of wind energy. (4) Lastly, while there is a general overall support for wind energy, social acceptance on a local level is influenced by institutional settings i.e. information availability, as well as public and stakeholder concerns. Involvement in decision-making as well as financial participation (e.g. community-ownership) affects public participation and acceptance. This paper goes into detail on these phenomena and discusses case studies in Europe and North America. Often, these challenges can enhance outlooks in policy and planning, posing solutions to wind energy challenges even in sensitive environments and triggering innovations such as adaptive management.

Keywords: wind energy; multi-level governance; policy factors; siting; green vs. green; social acceptance; adaptive management

1. Introduction

There is a shift of energy systems toward the use of more renewable energies with governments worldwide setting ambitious goals to increase their share of green energy in production and consumption. For instance, Germany's "Energiewende" (Energy Transformation) is an impressive goal for the country to reach a 55–60% renewable energy production by 2035 [1], by expanding renewable energies, energy efficiency, and electro-mobility sectors.

By mid-2014, worldwide wind capacity reached 336 GW on- and off-shore, and an additional 360 GW is expected by end of 2014, thereby covering around 4% of the world´s electricity demand, with the global prognosis by 2020 to be greater than 700 GW. The world energy market has developed significantly in 2014: China, the U.S., Germany, Spain, and India still represent 73% of the global wind capacity with Asia's rapid growth overtaking Europe as the leading wind continent. Within Europe, Germany has the best wind market with a total capacity of 36.5 GW, ranking third in the world for wind-installed capacity. In the case of North America, the U.S. had a dramatic drop in the first half of 2013, but in 2014 recovered its market and is still second worldwide in wind-installed capacity, with 62 GW. Additionally, Mexico has been part of an emerging wind market in Latin America (together with Brazil). However in the last few years, Latin America's wind energy has increased at a more modest level, Mexico is the 21st country with wind-installed capacity of 2 GW (with Brazil becoming third largest market for wind turbines and 13th in world ranking) [2].

Important factors come into play in wind energy implementation, political institutions, natural resource endowments, policy deregulation, state GDP, electricity per person and price, nonrenewable energy prices, possible regional Renewable Portfolio Standard (RPS) policies, and consumer demand for green power [9,10]. Forerunners such as Germany [11,12] and the U.S. [9,11,13] and emerging countries such as Mexico [14,15] have attempted to create mechanisms that allow for easier development of wind energy and allow factors such as endowments, regulation, and participation to further implement the industry into the energy sector. But with these factors come challenges proponents and investors must face. Factors within political and market phenomena, spatial planning and their limitations, environmental conflicts, and social acceptance with local populations all stem from the cooperation and planning in multi-level governance systems.

This paper is broken down into sections including case studies from Germany, the U.S., and Mexico. The first section discusses the positive aspects of multi-level governance but with it challenges proponents must face in developing wind energy. Following, policy and market strategies have created assistance in developing renewable energies, but can become complicated for continued growth in wind energy. The third section covers siting and spatial planning implications while also providing insight to measures that can counteract conflict. The fourth section discusses the relationship of policies that protect the environment with policies promoting renewable energies while the fifth section analyzes social acceptance and wind energy development participation. Lastly, the paper discusses enhanced outlooks in policy, planning, and operational innovations that may curtail challenges, with focus on onshore wind energy development.

Table 1. Overview renewable energy goals and 2014 status in USA, Germany and Mexico.

	Goal Renewable Energies	Year	Goal Wind Energy (MW)	Year	Installed Power Renewable Energy (2014)	Worldwide ranking (WWEA, 2014)	Installed Wind power capacity Onshore (mid-2014) MW	Installed Power Wind Turbines
USA	20%	2030	-	-	16%	2	61,946	>46,100[1]
Germany	40-45%	2025	Growth rate of 2,500 MW per year		28.50%	3	33,757	23,645
	55-60%	2035						
	Min. 80%	2050						
Mexico	23-26%	2024	5,080	2016	23.08%[2]	21	1,992	1,927
			12,176	2025				

[1]Total number of operating utility-scale wind turbines at the end of 2012 as there is no current estimate
[2] From total: 21.07% hydro, and just 1.1% from wind energy and the rest from other renewable sources
Source: [1–8]

2. Multi-level governance

Great strides have been made in the transition of producing and integrating more renewable energy. Federal systems as those in Germany, the U.S., or Mexico with multi-level governance structures have seen changing relations between the different governance levels, and the "increasing variety or organizations and individuals beyond the government who are becoming involved in policy" [16]. This type of governance system requires different authorities from federal levels to states, regions, counties, and municipalities to collaborate. However, conflicts may arise between the different levels, especially when planning decisions and the actual implementation of projects take place [17]. For example, problems for federal governments could be fostered when approval procedures for wind farms differ widely among U.S. states. Permitting processes rely on various responsible parties, depending on the owner of the proposed land site and who is developing the project [11]. Multi-level governance therefore must face decision-making uncertainties, regional differences (e.g. wind potential), and the existence of competing land uses in the area [18].

While financial incentives, federal laws, and policies are enacted from the top levels (federal and supranational), influences in wind energy development can come from lower levels (regional and local) in terms of local acceptance, nature protection criteria, and regional added values (e.g. as discussed by Cowell [19]). Federal state specific regulations can foster or additionally complicate the process. So far, Germany's wind planning and development has no specific strategic coordination from the top level, besides financial incentives regulated by law (which is similar in the U.S. [20]), but decentralized development can be observed where lower administrative units increase their share of renewable energies independently (e.g. 21). This bottom-up approach can be established on sub-national levels by developing strategies for energy use or climate protection on local and/or regional levels [22], as well as forming citizen/civil cooperatives and community ownerships for new energy projects.

In contrast to governments where bottom-up movement plays an important role, the case study in Mexico (in a later section) gives an example where a top-down planning approach can trigger

negative impacts such as local opposition to wind development. The decision-making direction from the top down does not provide efficient possibilities for effective public participation [15]. The financial support from international market-based policies has limited, in the case of Mexico, the participation of stakeholders and civil society in the wind energy planning process, mainly due to no national regulatory framework for participatory mechanisms [15,23].

On one side, decentralized initiatives regarding wind energy development are innovative, as they create a need for producers and operators to specialize, find solutions tailored to local contexts, and provide opportunities for mutual learning for all stakeholders and proponents [24]. These systems are expected to add more value to the region, create jobs [25], and increase public acceptance as well as to allow a more democratic production and supply structure [26,27]. On the other side, decentralized systems can cause a lack of communication and coordination on the higher strategic levels in terms of grid expansion, discontinuous energy supply, uneven distribution of energy facilities among the federal states, distance to consumers in sparsely populated areas [22], and the resulting uneven spatial distribution of economic advantages and disadvantages [18]. These changes bring in new actors and interest groups which can alter actor constellations significantly [18], leading to an even more urgent need of more cooperation to push wind energy development. Existing steering mechanisms of multi-level governance systems are characterized by a duality of influences. Klagge (2013) [18] discusses two impulses initiated on the national level: Economic incentives through energy policies, e. g. feed-in-tariffs, and on the other hand spatial planning processes which are put into concrete terms on regional and local levels. Thus, communication between these influences in this energy transition towards more renewable energies is necessary [27]. For instance, Germany is at a distinctive stage in this transition where coordination is needed in order to steer the "Energiewende" ship [22,28].

Case Study: The bottom-up approach in Schleswig-Holstein, Germany

The German federal state of Schleswig-Holstein shows a good practice example of bottom-up governance between different administrative levels, efficiently working and integrating all wishes and suggestions from various proponents. Through the integration of all administrative levels as well as public participation (financially and in the planning process), less objections and an increasing acceptance from local communities (see Social Acceptance section) was achieved, benefiting the creation of value in the region.

Schleswig-Holstein's bottom-up approach worked by a simple but expensive process, integrating municipalities and counties into the process of finding new areas for wind energy. First, the counties elaborated concepts (Kreiskonzepte) and took into account the wishes and proposals of their municipalities regarding priority areas for wind energy. The participating municipalities discussed possible areas in public hearings and partly via local referendums [13]. *After the application of other planning criteria (e.g. buffers for protected species, protected historic buildings and monuments, and characteristic landscapes), the counties finalized their integrated county concept. These informal instruments where then examined and evaluated by federal state planners who developed a first draft of a new regional plan (in Schleswig-Holstein, the federal state is responsible for regional planning). This draft was then again subject to public display and thereafter the new regional plan came into force December, 2012* [29,30].

While a top-down impulse can be given through market factors and respective laws from

national governments, it is not always effective. Nonetheless, German energy and spatial planning policy underlies the concurrent legislative powers, meaning that, in general, the federal states can enact laws so long as the federal government does not exploit their legislative power [31]. A second impulse is provided by economic incentives, which influence the realization of projects. This includes successful feed-in tariffs (FIT) (e.g. Germany, Spain), RPS (e.g. U.S. states such as Texas), and green energy options (e.g. 11 U.S. states, and Germany).

Most important in multi-governance systems is the communication and coordination of activities between local, state, and federal level [22,27] in order to facilitate issues within the factors of policy and market phenomena, siting, environmental protection, and social acceptance. This best practice would include simultaneous involvement between all governance levels, providing suitable wind energy development information to all in order to find sustainable solutions [24].

3. Policy and market phenomena

Policy factors that support the implementation of wind energy development include: Command-and-control policies such as RPS, market-based policies such as required green power options and Clean Development Mechanism (CDM), and incentive-based policies such as clean energy funds (CEF) and FIT. These policy instruments can be influential in this sector, but as they are implemented at different levels of government, and have volatile continuances, their success can be unclear and is undetermined whether growth will persist in wind energy development. The success of each of these policy designs for renewable energies is based on different political environments, and their electricity markets nationally or statewide. Additionally, wind energy proponents face economic, structural, and political variables dependent on the location of future projects [32].

3.1. Renewable Portfolio Standards & green power options

RPS are state level incentives mandating energy utilities to include specified capacities or sales for renewable energies into the energy market. This policy mechanism has significant impacts for renewable energies [32–34], not only encouraging technologies to incentivize competition [35] but also stay as a market-based approach to allow many states, for instance in the U.S., to invest in wind energy projects and expand in this industry greatly [32,33,35,36]. Furthermore, CEFs can advance RPS sales requirements, as these incentive-based programs are “carrots” [32] for states to stay on course to ensure renewable deployments such as wind energy projects. State-level CEF programs assist in funding grants, loans, and incentives for research and development and actual deployment regardless of any financial support they may receive from governments. However, a challenge in using CEFs is the delay between receiving the award and the actual start of the project construction, averaging four years in the U.S. [32]. Required green power options have been another market-based policy mechanism giving customers the option to purchase renewable power at a premium, creating increasing demand for renewable energies while allowing consumers to express their preferences in energy. However, differences in policy effectiveness [36], administrative and deployment barriers [35,37], and environmental factors (i.e. wind quality) [10,35] determine and can hinder further development. For instance, in the U.S., there is no single driver for wind development [9] and can be due to various state policy designs: Only 11 states offer green power energy options, and

Texas leads in RPS due to minimum government involvement and least cost [35]. In Germany, the green power option has been available since the market liberalization in the late 90s [38] relying on feed-in tariffs (similar to Spain [39]), while in Mexico none of these options are yet available.

Case Study: Removal of tax incentives in Idaho, U.S.—a negative fiscal and economic impact

In 2012, Idaho's wind energy capacity was 675 MW, growing from 75.22 MW in 2005 following the passage of a state incentive tax rebate for alternative energies [33]. *Opponents including some state officials were upset about the possible change in scenery, individual property values, sense of local place, and expressed concern about the early cost estimate of $47 million for the tax rebate—despite what future revenues it would bring in—and its lack of effect on Idaho's general state fund. An unfortunate reality of state officials is their tendency to look at immediate costs, spend based on current resources, and cut incentives, expenditures, and revenue collection efforts for short-term reasons in times of economic slumps. In July 2011, Idaho legislature failed to approve the extension of the "sales and use tax rebate incentive"* [33].

While Wind energy producers can benefit from the 1978 federal Public Utility Regulatory Policies Act (PURPA), which promotes the development of alternative energy technologies by requiring electric utility companies to purchase alternative energy, Idaho Power and two major utilities effectively shut down PURPA by limiting contracts to an unrealistic option for commercial wind and solar projects [40]. *Without any RPS, tax rebate incentives, and supporting contracts, 15 wind facility projects in Idaho were brought to a halt.*

While wind energy project development is still at a standstill in Idaho, there is hope for development. In March 2013, clean energy advocates in Idaho gained a strong ally with the federal government as they stepped in and sued the state for failing to enforce PURPA [40]. *As efficient energy is strongly supported, renewable energy advocates and wind energy developers have a tough battle ahead against Idaho Power.*

3.2. Clean Development Mechanism (CDM)

Mexico has expanded their renewable energies portfolio through adopting a market-based policy established by the Kyoto Protocol (1997) called the CDM as an effort to address climate change in reducing targets of greenhouse gas (GHG) emissions [41,42]. Benefits of domestic development from CDM include transfer of technology and "know-how" from other countries and can successfully be seen in the case of China and India, who have taken advantage of this transfer and have become world leaders in wind energy [2,43]. Conversely, countries with no domestic wind industry have a lower rate of development [43] which hinders the effectiveness of CDM. In the case with Mexico, while CDM has been effective financially for wind energy, development has slowed not only due to ineffective public participation but also a weak regulatory framework [44], inefficient transfer of technology and domestic development, lack of sufficient private and public infrastructure [14], and competitive public-private partnerships [45]. The lack of a participatory framework has led to poor stakeholder involvement (see Mexico case study) and challenges from local populations, weakening the potential for CDM to fully benefit wind energy development in Mexico.

3.3. Feed-in Tariffs (FIT)

Denmark and Sweden historically and Germany and Spain currently [46], have provided a stable, profitable, and incentive-based option for renewable energy to enter into the energy market. Germany has established a very successful and mature feed-in tariff (FIT) system for the last twenty years [11,12,46], providing investors with above-market prices offering long-term security. While FIT reduces policy volatility, it has been criticized for being costly and ineffective [47], with costs being reallocated to paying for electricity [46]. Similar to RPS, the success (e.g. Spain, Germany) and failure (e.g. Italy) depends on the country and their specific existing environment [37]. While FIT gives renewable energies the necessary push in beginning stages, the concern is their necessity to become competitive in the market, moving from incentive-based to market-based. This current development is observable in Germany [1] where FITs will be lowered, and it is a matter of time to see how wind development will adapt with this new change.

4. Wind turbine siting

After political renewable energy targets have been set, it is crucial to identify areas eligible for the placement of wind facilities in order to meet those targets. This implementation and development process has been difficult in many countries and regions due to complex planning and permitting processes, as various spatial demands have to be included in a balancing process. Guidelines and conventions from different fields have a regulating impact on the availability of space for wind energy development [48] and can trigger land use conflicts. This mostly includes requirements on designated buffer zones from other land uses such as residential areas, roads, nature reserves, aviation security systems, or weather radar [e.g. 49–52]. Combining those buffer zones can limit the available space for further land zoning and thus project development. Additionally, aspects of adequate siting in terms of energy yield (wind speed and topography) and access (grid proximity and road access to turbines) are intersected with remaining land [53]. Internationally, the idea of buffer zones has been discussed for nature (e.g. protected areas in Mexico) and residential areas (e.g. UK) but in both cases these proposals were withdrawn [54,55].

4.1. Residential areas

For wind energy during the past years, general support for continued development has been high [56]. However, acceptance at local levels for turbines can be lower [56,57] as hosting communities worry about changes in quality of life [58,59] and property value [60]. Yet recent research indicates wind turbines in close proximity to residential areas can cause visual and health impacts by lighting, shadow casting, noise and low frequency sound [61–63]. A possibility to minimize local discontent for wind turbines is siting at a publicly accepted distance to residences [64].

Case Study: Buffer zones for residential areas in Bavaria, Germany

Wind energy planning guidance documents often suggest a certain separation distance between an onshore wind turbine and residences. They might suggest that within a distance of 500–1000 m [65] *or a factor of ten times the height of a facility (as suggested in 2014 by the Bavarian state*

government [66]*), no turbines should be sited. Issues in this approach can be seen in wide-ranging distances that are implemented without a case-by-case review. Acting from the assumption that turbines in Germany and particularly in the state of Bavaria have an average height of approximately 160–190 m* [67]*, this could lead to required distances of 1.6–1.9 km. An intersection of the remaining land (with a buffer zone of 2 km) with required wind speeds calculated by the Bundesinsitut für Bau-, Stadt- und Raumforschung (BBSR)(2014)* [68] *came to the conclusion that only 0.86% of the state is then eligible for wind energy development. Buffer zones implemented in regional planning can therefore limit the availability of land for wind energy development to such lengths that an achievement of high renewable goals becomes unlikely.*

Additionally, instead of using buffer zones, other solutions such as curtailment to limit nighttime noise, the use of less stress evoking types of light [63], or lighting as needed can mitigate some impacts on individuals (e.g. stress through annoyance, distraction, or disturbance). Also, siting turbines with limited visual impacts from residents or using a previous illustration of potential developments (e.g. 3-D-visualizations) can raise acceptance [69] and, therefore, substitute buffer zones to some degree.

4.2. Proximity to infrastructure

Wind development is often concentrated in areas with existing pressures from other infrastructure development in order to bundle infrastructures (e.g. roads, railroads, or transmission lines) [70]. Wind turbines in close proximity to roads can, however, cause security problems in cases of technical incidents such as fire or the detachment of a blade, as well as the possibility of icing events due to low temperatures [61,71]. Tumbling or gliding fragments can be thrown up to approximately 2,000 m [61]. Consequently, a security buffer zone is often placed around roads and excluded from siting with a recommendation ranging from 15 m for district roads up to 300 m for interstate roads/highway in Germany [70]. Strict buffer zones could be overcome by the installation of safety equipment (e.g. ice sensors, active heating or lightning protection) and regular maintenance inspections [70]. Based on those precautionary measures, case-by-case reviews could lead to an approval even within a buffer zone.

4.3. Aviation security

In several countries such as the U.S., Germany, and Sweden [49,50,52], potential effects caused by wind turbines on radar installations delay and partly prevent further development of wind energy. In Germany, projects with about 1,700 MW [72] have been denied on the level of permission due to conflicts with radar devices. While it is difficult to assess, the influence of wind turbines on Civil and Military matters depends on the technology used [49] and obstacles such as wind turbines can reduce a security system's quality and range [50,73]. With the aim of ensuring aviation security in several countries, a radius around the facilities of up to 15 km (for VHF Omni Directional Radio Range, i.e. VOR) is set for computer simulation assessment [73], and can further restrict the available area for wind energy. Additionally, buffer zones to other radar devices that experience conflicts with wind turbines such as weather forecast radar installations [50] are considered during siting processes and can limit the available space for wind energy development.

4.4. Nature reserves

Wind energy causes impacts on wildlife through direct and indirect mortality, barrier effects, displacement of species (especially bird and bat species) and disturbance [74, e.g. 75]. In order to protect wildlife, in several cases radiant buffer zones around breeding areas, protected habitats, and passageways for migrating birds are implemented. Depending on the targeted planning level (regional planning or permission) and if buffers are legally binding or simply recommendations, their impact magnitude on the siting process can vary. In Germany, buffer zones have been developed for birds following the precautionary principle [76] and can be seen in the case study below. A study in the state of Kansas has also developed avoidance areas around bat habitats [77]. However, in order to protect wildlife, avoidance of impacts with good macro- and micro-siting as well as minimization of impacts through selected measures (e.g. curtailment) are sophisticated solutions as well. For example, the option of repowering is not to be neglected, as several turbines can be replaced by one turbine and still increase energy production [78].

Case study: Working Group of German State Bird Conservancies (2007): "Recommendations for distances of wind turbines to important areas for birds and breeding sites of selected bird species" [51]

For Germany, in 2007 a nationwide working group defined buffer distances of "wind turbines to avifaunistically important areas or nest sites of species particularly sensitive to interference that are necessary from the perspective of species conservation" [51]. *The paper includes species specific data for exclusion zones as well as radiuses for further assessment for sensible breeding birds. Additionally it identifies exclusion zones around habitats and protected areas. It thereby intends to provide guidance in (regional and local) spatial planning as well as in permitting procedures. The guidance is currently revised and the process has been criticized in particular by planners, as distances are defined as minimum distances and therefore exclude areas for development prematurely, disregarding the possibility of project-level mitigation measures in order to preserve a certain conservation status* [79].

5. "Green vs. green" dilemma

The green vs. green dilemma involves the disjointed relationship between environmental policies which protect wildlife to those which promote renewable energy for climate protection [76,80]. With worldwide concern of climate change, regulations and goals are increasingly being established and the focus to invest in renewable energies has been a driving force. However, nature and animal conservationists argue wind energy directly and indirectly affects habitats and surrounding ecosystems, growing concern in ensuring environmental and species protection while creating policies that promote wind development and operations. Several authors [75,81,82] conclude that turbine characteristics such as size and capacity, siting, abundance of turbines, and human activity all determine the risk to wildlife through possible habitat loss, habitat displacement, avoidance (e.g. barrier effects), and turbine collision [74]. Policies and regulations have been created in different countries aimed at lowering these environmental concerns, but with conservationists and policy-makers still concerned about wind energy's environmental impacts, developers struggle in implementing wind energy development [76]. Through effective planning and siting, negative

impacts on wildlife species and the surrounding environments can be mitigated [83] while European and specific country goals in climate protection are still priority.

5.1. Impact Mitigation

Wind development through mitigation can avoid impacts when possible, minimize remaining impacts, and then compensate unavoidable impacts while still reducing CO_2 emissions. Mitigation measures are listed in state or federal documents (guidelines, regulations or policies), depending upon the country, state or region a project may fall under (e.g. US Fish and Wildlife Service (USFWS) Land-Based Wind Energy Guidelines, Ministerium für Klimaschutz, Umwelt, Landwirtschaft, Natur- und Verbraucherschutz des Landes Nordrhein-Westfalen (MKULNV) Leitfaden (e.g German regional guidelines)). However, lengthy permitting and approval processes can possibly hinder or completely halt construction of these sites. Environmental Impact Assessments (EIA) and Strategic Environmental Assessments (SEA) are key regulatory mechanisms supporting sustainable energy projects and are used to determine and, where possible, mitigate the effects a project has on its environment. These mechanisms address environmental problems, sustainability, and integration of policy—and planning—making either on a case-by-case basis (i.e. EIA) or as a systematic process (i.e. SEA) [11,84]. EIA and SEA inform proponents of all environmental concerns they must take into account and mitigate. Mitigation can include a number of measures ranging from feathering and cut-in speeds (measures of avoidance or minimization) to rehabilitating or restoring an off-site piece of land to offset damage done by the project (compensation measures) [81,82].

One concern mitigation brings to wind energy development is the possibility of additional, costly, and time-consuming measures which may not be financially beneficial to stakeholders invested in wind energy projects. These environmental impact policies can be political "chokepoints" [80], hindering development of wind facilities by answering ecological questions such as: (1) Does this project meet environmental standards?, (2) What environmental requirements have been met in this project?, and (3) will endangered species be affected, if at all? [80]. While it is vital to have these environmental laws and regulations, developers having to answer such questions may feel these slow down implementation and development, or risk the complete shutdown of their projects. Conclusively, the green v. green dilemma includes political, legal, and administrative drawbacks the renewable energy industry faces between local environmental conservation and global climate change mitigation [80,84].

Case Study: Beech Ridge Wind Energy Project in West Virginia, U.S.

The Beech Ridge Wind Energy Project is located in West Virginia, U.S., consisting of 67 wind turbines (Phase I) and is currently constructing another 33 turbines (Phase II). When the wind facility was approved for development in 2006 and set to begin construction in late 2007, it was not until mid-2009 when construction began as previous case hearings and decisions delayed the project. Once construction began, Beech Ridge was again involved in litigation, alleging the project violated Section 9 of the U.S.'s Endangered Species Act in failing to create and apply for an Incidental Take Permit (ITP) for the endangered Indiana Bat (Myotis sodalis) and the endangered Virginia big-eared bat (Corynorhinus townsendii virginianus). A federal district judge ruled that while the construction of Phase I be completed, Phase II could not begin until an ITP was approved

and issued by the U.S. Fish and Wildlife Service for the Indiana Bat. Furthermore, the judge ordered immediate mitigation measures for the existing wind turbines, allowing them to only run during winter months when the bats were hibernating, so as to allow time for the completion of a Habitat Conservation Plan (HCP) and a Final Environmental Impact Statement (FEIS) to include full environmental assessment and improved mitigation measures.

Both the HCP and FEIS were completed in 2013 and the permit issued in December the same year, but with massive changes to the original project and additional mitigation measures. The developer dropped 24 turbines in Phase II to only construct a total of 100 turbines [85] *and moved the site of Phase II further away from known bat hibernacula/caves. Some mitigation measures included limiting tree clearing, speed limits for vehicles, and implementing a turbine operation curtailment plan: This plan specifies feathering all turbines at less than 2 rpm below the 4.8 m/s cut-in speed beginning at sunset for a period of five hours from July 15 through October 15 (period with the highest peak in bat mortality).*

In conclusion, with litigation, "updated" mitigation measures, and changes to the project, the (now) 100 wind turbine project, which began nine years ago, is still under construction today. Cases such as this are a concern for many wind developers, investors, and policy-makers as these processes can quickly become lengthy and expensive.

6. Social acceptance

While there is an overall assumption of global positive opinion of wind power and impressive wind development targets, the challenge remains on the institutional setting as well as in the local level of social acceptance. Wüstenhagen (2007) [86] confers three aspects of social acceptance in renewable energy innovation: Socio-political, community, and market acceptance. Planning and siting dimensions are also emphasized as a limiting factor for achieving social acceptance, moreover when decisions in the national level implies local policies and its affectations. This factor can be of major importance in emerging countries where wind energy deployment can push local and regional development [87]. Socio-political acceptance is a more general definition, as it implies the general attitude towards renewable energies policies, the implication of the stakeholders in the decision-making process, and the general institutional framework within the process of wind energy development [86]. Empirical research shows community acceptance of wind energy and its legitimacy outcome depends on public attitude towards wind power which includes the following: Landscape and visual impacts [88], as well as environmental and social justice frameworks within benefit-sharing by wind developers and the benefits accepted by the community [89,90]. Concerning market acceptance, there is a common discourse that financial participation raises acceptance significantly [91–93]. Maruyama (2007) [92] argues that community wind power can be not only attractive for citizens, but also produces a "social innovation experiment" by boosting the participation at a local level. However, despite the fact public attitude is better within a community wind power scheme, it does not mean it brings overall positive opinions. Changing the development model towards promoting a local approach as well as consultation and early communications within the society can reduce this controversy [94, 95].

For example, in order to raise local acceptance and to maintain added value in the region, concepts of financial participation for local populations have been implemented in Denmark. In 2009, the Danish Renewable Energy Act required project developers to offer at least 20% of ownership

shares to those within 4.5 km of the wind energy project and subsequently to all inhabitants of the respective municipality. In Germany, the state of Mecklenburg-Vorpommern has been discussing in adopting this approach [96]. Some studies on social acceptance in Germany have found additional factors of success such as networks of support [88], community ownership, quality of information and consultation [93], as well as participation and transparency within the planning process [97]. In the case of the U.S., most successful experiences on siting are those with multi-stakeholder processes (e.g. U.S. Fish & Wildlife Service guidelines) [98], and as wind projects permits differ from state to state, a case-by-case approach in the U.S. can be most efficient.

Case study: Market-based policy and the growing opposition in Mexico's top-down planning

Despite Mexico´s great potential for expanding renewable energy, the country struggles in taking advantage in this sector. By the end of 2013, installed power capacity was 53.06 GW with only 1.1% from wind energy [99]. *Mexico is one of the four countries that host most of the CDM projects, however mostly only biogas from breeding farms* [100]. *Most wind energy deployment has been financed through CDM, with 31 out of 49 wind projects in the country, corresponding to 4,429 MW installed capacity, from which 20 out of 23 wind projects were developed in Oaxaca* [100,101].

Concerning technology-transfer through CDM, Mexico has the highest rate of technology imports among the major host countries for CDM [102]. *However, high level of wind technology import does not allow development of domestic technology. Additionally, wind energy development in Mexico is experiencing heavy public resistance, specifically where major development has been settled. In the Isthmus of Tehuantepec in the Oaxaca state, an area with high presence of indigenous population* [103]*, there is also a critical need to design a fair social benefits program* [104]. *Corbera und Jover (2012)* [15] *states that there is a limiting participatory mechanism (regulatory framework) of the civil society in the process of CDM project validation which can trigger further social conflicts. Nevertheless, there is little acknowledgment on dissemination of lessons and experiences for managing such social issues in the area* [105]*, which could help to improve further development. The case study of Mexico illustrates how multi-governance processes influence the country´s wind energy deployment, in which their top-down approach has caused negative impacts. Due to international involvement regarding CDM policies, domestic technological innovation seems hindered and proper public participation limited. The lack of proper participation as well as a weak institutional framework for renewable energies has created local opposition to current and further wind energy deployment. If Mexico expands its limited participatory framework, and establishes national requirements for a stakeholder consultation process beyond UNFCCC requirements* [106]*, performance and acceptance of CDM projects may increase, thus improving further development in wind energy and domestic technological innovation.*

7. Outlook

Wind energy development positively correlates with situations in the electricity market, dependencies on coal and natural gas, and government policies on reducing CO_2 emissions contingent on the country. Innovations need to be designed to better implement wind development, minimize challenges, and cater to the country and their policies. As stated previously, better macro- and micro- siting in turbine placement in terms of energy yield and access, along with better technologies of safety equipment and radar devices are possible innovation methods to minimize

wind siting implementation challenges. However, on a grander scale, better policy design, more efficient systematic plans, and the use of "adaptive planning" are other methods in innovating wind energy development.

7.1. Policy design

Creating a more effective policy can incentivize competition in wind technologies and continue the development of wind energy. Through each country's best practices, establishing a hybrid policy using short term goals (e.g. RPS) with long-term effects (e.g. FIT) [35] can lead to a more stable process for investors, developers, and consumers in wind development. Another aspect to improve policy design is refining the issue of grid access and smart grid regulations for renewable energies as a whole [35,37]. Lastly, minimizing administrative barriers can increase homogeneity for planning procedures and development of wind energy [11]. If this idea is taken at a regional scale in countries such as Germany, it would reduce administrative process duration and increase higher utility gains [37].

At institutional levels, some criteria can improve and promote wind development in an environmentally sustainable way such as coordinated energy political institutions, legitimate planning procedures, improved SEA mechanisms, and stringent permission and assessment requirements [84]. Through better overall strategic planning, environmental impacts can be minimized while still aiming at climate change mitigation goals, lessening the green vs. green dilemma.

Lastly, addressing the challenge of acceptance in a wider approach could lead to better practices of wind energy implementation, where the fundamental factor is to adapt, manage, and create new institutional changes for combining all dimensions of social acceptance. Thus, these planning approaches could trigger trust between involved stakeholders and help to build better networks of support of wind development (e.g. Wind Powering America Initiative).

7.2. Adaptive Planning

Adaptive planning and operation strategies (i.e. adaptive management) is an intuitive and practical concept aimed at maximizing renewable energy while minimizing, for example, wildlife interactions, shifting from up front decision-making processes to better planning models governed by a more post-project follow-up [76,107]. This knowledge accumulation and "learning by doing" [108] focuses on the "[reliance] on predictions and modeling, recognizing environmental dynamics, incorporating monitoring based adaptations, and being grounded in the creation of trust among stakeholders" [76]. However, developers and investors have concerns of its reduced, up front planning security, monitoring costs and continued implementation, and lack of disclosed data but "combining phased development with collaborative planning approaches could provide the trust and social capital" [76] to those involved, and establish better cooperation and communication between scientists and wind proponents allowing further development of adaptive planning and management of projects [109]. Impacts on wildlife are not fully understood, and this advanced and evolutionary process might help in more efficient planning and development of wind energy (e.g. in contrast to trial and error management) [76,109].

8. Conclusion

Wind energy development will constantly face challenges, at various regulatory and institutional levels whether it be regarding political and market factors, siting issues, green vs. green, and/or within social acceptance. Policy and market methods for renewable energy and wind energy implementation, i.e. RPS, green energy options, FIT, and CDM, are regarded as highly successful and influential, but cannot be done on their own; the success of these incentives depends heavily on the structure of governance systems and their willingness to implement these methods. Coordination between different levels of governance, from a local scale to a supranational scale, must be a priority in order to minimize implementation and innovation challenges, mitigate climate change, and continue the development of wind energy.

Due to the creation of inflexible turbine-free zones, countries with limited land availability are challenged by the obligation of implementing buffer zones for several topics (residential areas, nature conservation, roads and aviation security). To improve future development of wind facilities, it is suggested that the main focus not be on spatially limited standardized buffer zones but be discussed and defined on a case-by-case basis according to specific regional conditions. As this can be very challenging, responsibilities either have to be distributed reasonably or the overall coordination must be limited to one governance level, leading to the main question of which level would be most suitable [21].

Lastly, acceptance of wind energy has a broader approach and the challenge remains on the institutional setting at all government levels as well as on the specific local setting. Thus, all levels of institutional conditions and decision-making, multi-stakeholder approach and network of support, quality communication within the society, and finally adaptation to changes are fundamental for effective wind energy planning.

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Conflict of Interest

All authors declare no conflicts of interest in this paper.

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Chapter III

Social implications of siting wind energy in a disadvantaged region – The case of the Isthmus of Tehuantepec, Mexico

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Social implications of siting wind energy in a disadvantaged region – The case of the Isthmus of Tehuantepec, Mexico

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ABSTRACT

This paper reviews the social implications of wind energy from four points of view: socio-environmental, socio-economic, socio-cultural, and stakeholder's involvement, and analyzes wind power projects in the Isthmus of Tehuantepec, Mexico, alongside the background of the literature review. Local economy, geographic conditions, culture, and stakeholders are fundamental when planning a wind project. Technology implementation for sustainable development must recognize the importance of reducing emissions and other environmental impacts, and maximizing socio-economic benefits. The aim of this paper is to review social implications of wind energy, with special emphasis on a disadvantaged region in Mexico, the Isthmus of Tehuantepec, with some of the world's highest wind energy potential, but one of the poorest areas in the country and with a large indigenous population. Wind energy development in Mexico has been complex and contentious; the large increase of wind energy in Oaxaca has created social conflicts in Oaxaca, which even might stop further wind project development in the region. Ultimately, local communities need to be considered in the planning and development process of wind power worldwide and the Mexican case shows the need for a national and regional policy, and a comprehensible on-site participatory planning.

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1. Introduction

Wind is one of the renewable energy sources with major development in the last decades. By mid-2014 wind capacity reached 336 GW worldwide. Latin America has become an emerging wind market mainly because of Brazil's rapid growth (4, 7 GW), followed by Mexico (3 GW) [1–3]. Governments around the world endeavor to stimulate the development of wind energy for several reasons: a) its GHG mitigation potential; b) its facility to increase energy security; c) its capacity for successful integration into existing electric systems in contrast to other intermittent renewable energy technologies; and d) its relative low costs compared to other renewable sources and even conventional ones [4,5].

While wind turbines are increasingly being built, a lack of social acceptance at the local level is also increasing as an important challenge for wind energy diffusion all over the world [6]. Far from the old-fashioned thinking of looking at social acceptance on renewable technologies as a NIMBY (not in my backyard) problem, there is a large number of academic and technical papers that explain that this is an over-simplistic view of people's actual motives [7]. Moreover, the concept of community benefits also results weak because it does not reflect a wide view on environmental justice [8]. From literature review, it becomes clear that information, consultation, and participation are key elements to the success and acceptance of wind farm projects. Therefore, although wind energy has numerous benefits, concerns of the local people have to be taken seriously [9].

Wind energy is a fundamental renewable resource to address climate change mitigation. However, in order to equally address a sustainable path in the social, economical, and environmental context, the technology implemented for sustainable development should not only be reduced to GHG mitigation, but also, to the minimization of other environmental impacts and the maximization of equitable distribution of socio economic benefits [10–14].

The aim of this paper is to review and explore learned lessons on the social impacts of wind power projects that might be transferable within wind energy locations in socially disadvantaged regions. The case study of the Isthmus of Tehuantepec in the state of Oaxaca, Mexico, provides rationale information on important factors of on-site planning mirrored against an international literature review. The main results of Oaxaca's current situation are presented together with a descriptive framework on the general background and international state of research.

Mexico has a huge wind power potential due to its privileged geographic conditions, and most of the current wind generation capacity in Mexico has been developed in Oaxaca, a southern state of Mexico, specifically in the Isthmus of Tehuantepec. By August 2015, the installed capacity just in this area was 2160 MW, over 2000 wind turbines, and it is expected to grow further (already concessions for 2800 MW by 2016 in the Isthmus) [2,15]. Yet, Oaxaca is one of the Mexican states with lowest index of development and highest poverty levels. In 2014, 67% of Oaxaca's inhabitants lived in poverty and 28% in extreme poverty [16]. While the impact of wind power typically focuses on environmental and economic aspects, social implications of wind power deployment are essential in many regions of the world, including Mexico. Despite the fact that wind energy has promoted investment in the state of Oaxaca, local acceptance is the central issue.

The paper is divided in three sections. After the introduction, we present a recent literature review on the social implications of wind energy divided into socio-environmental, socio-economic, socio-cultural, and stakeholder's involvement. The second section gives a review on wind power regulation, installed capacity and future plans in Mexico. In the fourth section, we analyze wind power projects in the Isthmus of Tehuantepec against the background of a literature review of social implications of wind power by following the same categorization of the second section (socio-environmental, socio-economic, socio-cultural, and stakeholder’s involvement). In the last section, a Constellation Analysis is provided in order to show empirical results concerning the experience from some of the stakeholders in a specific wind park planning process. Finally, conclusions and recommendations are presented.

2. Social implications of wind energy: an overview

Social impact is understood as the adaptation of a social system to external changes (environment, economic, cultural), including the social and cultural consequences that modify the way of life and the relationships between people in a community [17]. Based on literature review, four different classifications of social implications of wind energy are suggested: Socio-environmental

Table 1
Recent references on social implications of wind energy.

Implications		References
Socio-environmental	Landscape	[17–38]
	Noise	[39–51]
	Shadow flicker	[41–45]
Socio-economic	Employment and local development	[44,47,52–59]
	Ownership, lease agreements, taxes, compensations	[24,52,56,60–66]
	Economic chains	[50,61,67–69]
	Electromagnetic interference	[38–41]
Socio-cultural	Socio-cultural values	[62,70,71]
	Rights of indigenous people	[72,73–82]
	Stakeholder involvement	[37,57,79,83–89]

(landscape, noise, shadow flickering); Socio-economic (employment and local economic development; ownership, lease agreements, property tax and compensations; economic chains and interference); Socio-cultural (socio-cultural values, indigenous peoples rights); and Stakeholders engagement (information, consultation and participation). There are several academic and technical papers on social implications of wind energy, especially on socio-environmental implications; Table 1 presents some of the most recent academic papers on these areas. In the following sections, we present a general review of social concerns to wind energy divided by the areas proposed above.

2.1. Socio-environmental implications

2.1.1. Landscape

Landscape is about the relationship between people and place. People value landscapes for many different reasons, related to aesthetics and scenery and also to their contribution to recreation and health, wildlife and biodiversity, natural resources and geodiversity, and local culture and distinctiveness [18]. Wind farms use large area of land, and therefore, one of the most important social complaints of wind power is its impact on landscape.

In general, public perception on landscape impacts of wind energy may depend on objective geographical conditions such as local population distance to wind turbines [19], density of wind farms [20], daily times people are visually exposed the turbines [21], height of the turbines [22], and aesthetic quality of the landscape [23]. However, many studies illustrate that the diversity of public perceptions depends also on different economic, social and cultural issues [24]. Henningsson, et al [25] and Devine-Wright [26] show for example, that different actors in different social and cultural positions can perceive the same physical landscape in different ways.

This appraisal is avowed by different case studies, which evaluate the variety of perceptions towards impacts of wind farms on landscape, which are related to: a) Socio-demographic characteristics (e.g. Germany) [27], b) both a physical landscape context and socio-economic parameters (e.g. Greece) [28], c) the importance of reducing electricity bills in the wind power acceptance (e.g. US) [29], and d) the importance of strong independent identity on landscape changes perceptions (e.g. The Netherlands) [30]. Negative public opinion regarding impact on landscape is rather high during the planning stage and significantly lower during the implementation stage [31]. Additionally, a notion of 'landscape justice' has been also fostered, which blends elements of deontological, virtue and consequentiality ethics [32].

Acknowledging the complex response of local communities to landscape impact of wind farms, several authors have developed methodologies that help in siting definitions, such as: GIS tool to quantify the visual impact of wind turbines and photovoltaic panels [33], geographical concepts such as place, landscape, distance decay, and territory [34], innovative planning process that includes landscape impacts [35], and the potential for using an analytical property rights framework that cuts across various levels of claims and value statements [36]. Federal and local governments have developed codes and guidelines to mitigate landscape impact of wind farms. Some examples are Scotland and Australia [37,38].

2.1.2. Noise

Noise is one of the more referred disturbances on human health by wind turbines [39–42]. Noise from wind turbines might be disturbing (100 dB on site) but it reduces considerably at a distance from the wind turbine (45–35 dB within a 350–700 m) [43,44]. A similar result was obtained in a recent wind turbine health impact assessment [45], which explains that the sound power level of a typical modern utility scale wind turbine is about 103 dB(A) and at distances larger than 400 m, sound pressure levels for modern wind turbines are less than 40 dB(A), which is below the level associated with annoyance in the epidemiological studies. Despite the relatively moderate level of noise, as compared with the noise from road traffic for example, the annoyance of the wind turbine noise seems to be often more considerable probably because of its frequency [25,46].

Unlike the subjective issues associated with landscape impacts, noise is quantifiable on the decibels scale. However, a great deal of subjectivity is encountered when determining the agreeability of a sound and its degree of annoyance [41], also associated with other factors [47], as it is higher among residents who do not receive benefits from wind turbines [48,49]. Regulations and codes have been developed to mitigate noise and annoyance by wind turbines in different parts of the world [50,51] .

2.1.3. Shadow flicker

Shadow flicker occurs when the rotation of wind turbine blades causes alternating periods of shadow and light. Tabassum-Abbasi et al. [41] and Lima et al. [42] gathered a wide review of literature on undesirable impacts of wind turbine shadow flickering over people living near wind farms. On a clear day, and a little after the sunrise and a little before the sunset, the shadow of a 22 m turbine blade may be visible up to a distance of 4.8 km [42]. However, the nuisance of undesirable shadow is more related to those living near the wind turbine [41,42,44]. An assessment by the Massachusetts Department of Environmental Protection and Public Health addressed the issue of shadow flicker, which encourages Germany's best practices with the recommendation of no more than 30 minutes per day or more than 30 h per year of shadow flicker at a point of concern based on worst case scenarios [45].

2.2. Socio-economic implications

2.2.1. Employment and local economic development

Economic benefits of wind projects to local communities depend on several factors such as: The ownership model and financing plan, the use of local, qualified labor and supplies, and the direct and indirect economic chains that the project is providing [52]. Job creation is one of the positive effects from renewable energy projects [53]. Although the major contribution (in the case of wind energy), is on the construction stage, when local jobs during operation and maintenance are more stable. Kammen et al. [54] estimated that wind can create during construction, manufacturing and installation between 0.43 and 2.51 jobs per MW, and 0.27 jobs per MW during operation, compared to 0.25 and 0.70 per MW in construction and operation respectively for a gas power plant. Furthermore, Henningsson [25] estimated one job per installed MW in the case that the wind farm is owned by local people and financed by local venders. Simas and

Pacca [54] gave higher numbers for Brazil (including turbine manufacturing), and estimated 13.5 persons equivalents for each MW installed during manufacturing and first year of operation of a wind park, and 24.5 persons-year equivalents over the wind park lifetime. In fact, local employment depends on several factors, such as the phase of the wind park, the manufacturing location, the geographical site, region size, and local demand for goods and services [25,55].

In a broader approach, Brown et al. [56] developed an economic analysis of wind farms in US counties and found an aggregate increase in county-level personal income and employment of 0.2% and 0.4% for counties with installed wind power over the same period. Likewise, Swafford and Slattery [57] found that the total lifetime economic activity for the state from the projects equated to more than $1.3 million per MW of installed capacity, and the total economic activity for the local communities was also substantial, to nearly $0.52 million per MW of installed capacity. Slattery et al. [58], based on a large questionnaire, also found that support for wind power in these communities is associated far more with socioeconomic factors than foundational aesthetic or moral values, with wind farms perceived as the vehicle that will reverse economic decline.

Saidur et al. [44] on the other hand, revealed negative economic implications of wind projects on local communities, where nearby wind facilities significantly reduce property values. Munday et al. [59] also question the economic development outcomes for rural areas in Wales from wind generation projects to date, by arguing that revenues from community benefits are low, and instead might be channeled to rural areas through a broader community ownership of wind energy projects.

2.2.2. Ownership, lease agreements, property tax and compensations

There are different experiences of wind development regarding ownership, which varies from large wind companies (e.g. Spain, Scotland and England/Wales), partnership frameworks (e.g. Germany, Denmark and the Netherlands), to local community ownership (e.g. Germany, Denmark) [60]. In many countries, leasing land to wind energy developers continues to be the most common way rural landowners are participating in wind energy. Payments depend on the country, place of installment, lapse of time and technology. The local benefit of lease agreements relies obviously on the fee, but also on the possible displacement of other land uses [56]. There are several guidelines developed in the US to guarantee a fair contract to land owners [61]. It has been documented that the land use fee in rural areas in the US is about US$2700 to US $7000 per MW [54,55,62], or an annual fee of $2000–5000 (US dollars) per turbine [25,62]. In general, locally owned community wind projects create even more of an economic opportunity for those involved than conventional wind farms owned by companies with limited local ties [52,61]. Other possible local benefits are for example, good-neighbor payments provide compensation to individuals who live in the vicinity of the turbines but who do not have a turbine on their property and therefore do not receive landowner lease payments. Community funds may be designed to finance different types of local community activities [61].

2.2.3. Economic chains

Economic benefits from wind projects are larger when they generate economic chains such as indirect jobs and benefits from component and material suppliers [61,67]. For example, in China, the price of wind power has been influenced by technology endorsement, learning-by-doing, local manufacturing, and local economy [63]. In Brazil, local manufacturing has allowed the country being regional leader in wind generation [3,64]. Besides, in the case of small-scale wind projects, local manufacture can improve local economy, by building local capacity and reducing costs [65].

2.2.4. Electromagnetic interference of local TV and radio transmissions

A negative impact of wind turbines can be also the possible interference with transmission signals from radio or television. More studies are needed on this matter but some authors explain that, modern turbines made by synthetic materials have much milder impact on the transmission of electromagnetic radiation [38–41].

2.3. Socio-cultural implications

2.3.1. Socio-cultural values

Socio cultural values represent the (implicitly or explicitly) shared abstract ideas about what is appropriate in a society [70]. It is not the intention of the paper to forth see on this behalf, but to point out that this very complex concept is essential in the local communities' decision to accept or oppose to a large wind farm project. In a study case elaborated in four diverse settings, Pasqualetti [66] found that a major concern from local communities in two of the sites opposing wind projects was that they imply significant challenges to cultural values. Ek and Matti [67] found socio-cultural values as the most important factor of peoples´ disposition to pay for reducing the negative impact associated with large-scale wind farms in Sweden.

2.3.2. Rights of indigenous communities

The UN declaration on the rights of indigenous people sets out the individual and collective rights of indigenous peoples, their rights to culture, identity, language, employment, health and education, as well as the right to maintain and strengthen their own institutions, cultures and traditions, and to pursue their development in keeping with their own needs [68]. The literature shows cases of wind energy projects on indigenous lands with increasing contradictions and in some cases violation to these rights [69–74]. In contrast, there are positive examples of inclusion of indigenous peoples rights in wind energy projects such as the province of Nova Scotia in Canada [75,76] and new approaches towards a more sustainable implementation of projects on this matter [77,78].

There are different international agreement addressing indigenous rights, the fundamental one is the Indigenous and Tribal Peoples Convention, International Labor Organization Convention 169 (ILO-C169), in 1957 and last revision in 1989; which legally promote the rights and recognition of indigenous peoples. The core of this convention is that governments are required to consult indigenous on issues that affect them and to guarantee the principles of consultation and participation in public life [79,80]. To date, 20 countries have signed the ILO-C169, most of them are Latin-American countries [81].

2.4. Stakeholders involvement: information, consultation, and participation

Public attitudes towards wind farms vary across countries and regions. A more integrated approach shows that information, consultation and participation are key to the success of a wind farm project. In the same sense, it is the simplification of the concept of community benefits that according to Cowell et al. [82] obscures other equally important perceptions that engage the role of community benefits in promoting environmental justice.

There are several studies that show that public support for wind farms increases when there is community participation in the planning process [57,83]. Odparlik and Köppel [84], state that

in general, access to Environmental Impact Assessment (EIA) documents is a basic tool for providing information within permitting processes. Likewise, dissemination of information is fundamental for social acceptance along with identifying information and participation as factors for local acceptance, and further considerations regarding ownership of the wind parks [85]. Empirical research in Australia considers that the lacks of prior and clear information, as well as inappropriate participation within the community are perceived as lack of fairness, which reduces legitimacy of the project [86]. Another study on community wind parks in Canada shows the importance of quality of consultation and early communication for increasing social acceptance and reducing conflicts [75].

Some international financing institutions (Inter-American Development Bank and the World Bank) requirements for financing projects promote social sustainability and enhance the process of information, consultation and participation [87]. However, framing an informed consultation and participation program, could be uncertain if the responsibility only falls in project developers [37].

3. Wind power in Mexico

3.1. Regulation

Until December 2013, Mexican regulation classified electricity as a public service provided by the State, allowing private generation (self-generation, cogeneration, and independent producer) to be sold to the stated-owned utility (*Comisión Federal de Electricidad – CFE*), acting as a unique buyer [88]. A legal figure called *self-generation societies* was placed, where private-private and private-public partners set up a society for generation and commercialization of electricity among associates, paying a fee to CFE for the transmission of electricity. The Regulatory Energy Commission (*Comision Reguladora de Energía – CRE*) was the organization that granted permissions for electricity generation (Fig. 1). So far, the majority of the wind energy projects in Mexico are large private investments under the figure of self-generation societies (Table 2).

On one hand, a constitutional reform approved in 2013, establishes that only transmission and distribution of electricity are public services provided by the State. Additionally, it transferred the central control of dispatch from CFE to an autonomous organization and opens the market for larger consumers [89]. Within the secondary laws of this Energy Reform, the Electricity Industry Law (2014) requires now a Social Impact Assessment for electricity projects, as well as an indigenous consultation with international standards [90]. The CRE is the public organism that will continue giving the permissions for new private developers. There is still uncertainty on the new form of renewable power development, but based on different regulations that have been approved, it will be oriented to promote private investment.

On the other hand, there are several regulations in Mexico that promote renewable energy sources (RES), although with conservative goals. The Law of Renewable Energy (*Ley para el aprovechamiento de las energías renovables*) approved in 2008, sets up the goal of 8% for renewables in electricity generation, excluding hydroelectric plants [91]. The General Law of Climate Change (*Ley General de Cambio Climático*), approved in 2012, set up a goal for the year 2024 to produce 35% of electricity by clean energy sources, although clean energy in official documents includes nuclear, coal, and gas with Carbon Capture Storage-CCS [15,92]. There are further incentives for private investments on RES. In 2005 a tax incentive for renewable energy was launched for private developers, which depreciate 100% of investments. And in 2011, the CRE established a special tariff on electricity transmission for renewable energy projects, 70% lower than the tariff on fossil fuel sources [93,94].

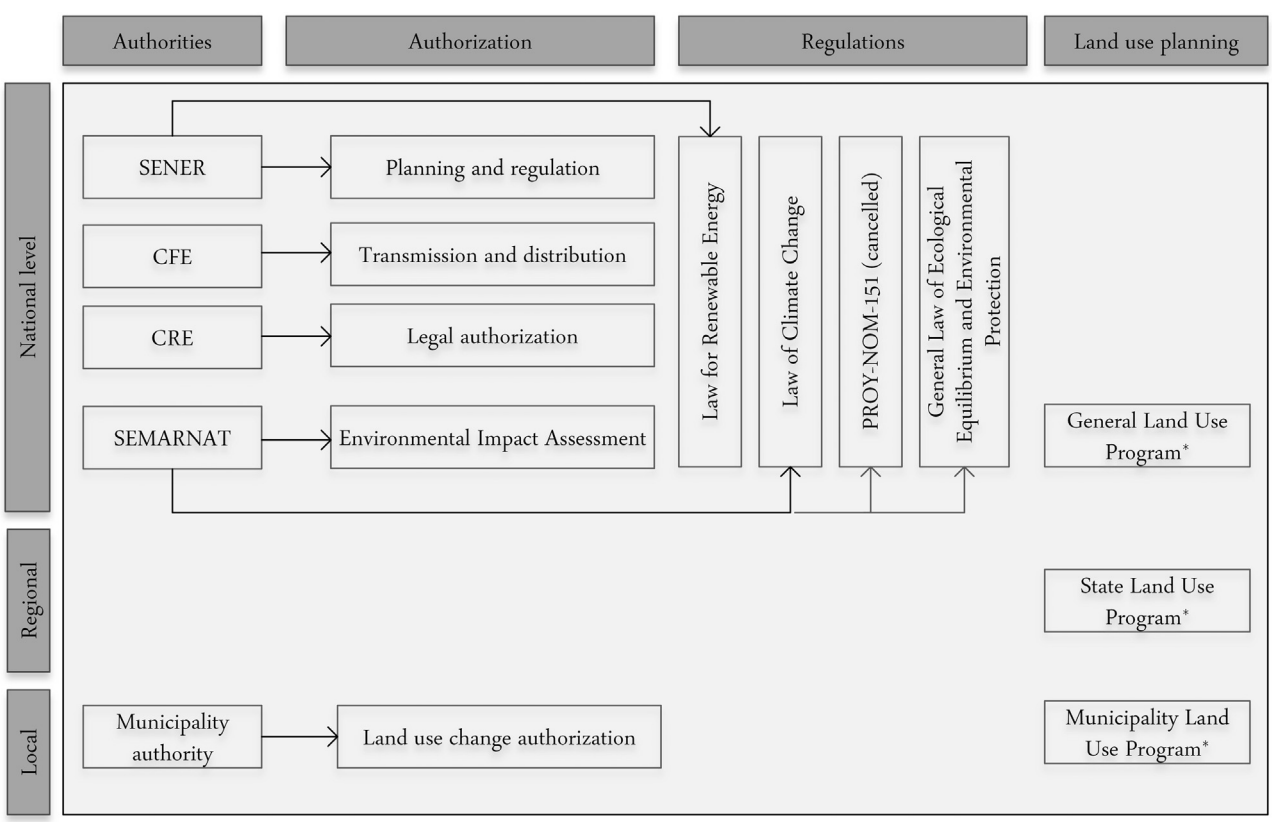

Fig. 1. Diagram of institutions and permits of renewable energy projects in Mexico. *Guidelines for further programs. *Note*: Please compare with the text for abbreviations.

Table 2
Wind installed capacity and under construction in Mexico by August, 2015 (MW).

State	CFE		Self-generation societies		Independent and small producers		Export	Total
	IO	UC	IO	UC	IO	UC		
Oaxaca (25)	86		1529.75	532.50	515.85	102	30	2796.1
Baja California (5)			10	102			457	569
Chiapas (2)			32	20				52
Chihuahua (1)						30		30
Coahuila (7)				1150.60				1150.6
Durango (1)				120.70				120.7
Guanajuato (5)				103		84		187
Hidalgo (1)						30		30
Jalisco (5)			50.4	380				430.4
Nuevo León (6)			22	592				614
Puebla (4)				416.40				416.4
Querétaro (2)				30		30		60
San Luis Potosí (4)			200	199		30		429
Sonora (2)				103.5		2		105.5
Tamaulipas (16)			54	1020.5				1074.5
Veracruz (3)				40				40
Yucatán (6)				262.40		90		352.4
Zacatecas (4)				402.50		30		432.5
Total	86		1898.15	5475.1	515.85	428	487	**8890.1**

Adapted from CRE [2]. IO: In Operation; UC: Under Construction.

Other environmental (e.g. EIA) and land use regulations related to wind power are the mandatory for wind parks with more than 3 MW that have to be approved by the Federal Minister of Environment and the permission of land use issued by municipal governments. Land use planning strategies in Mexico are quite new. Since the year 2000, several governmental institutions have been working on guidelines for land use programs on the national, regional, and local levels, although there are some states in Mexico without a regional land use plan [95].

3.2. Wind power installed capacity in Mexico and future plans

In 2014, the total installed power capacity in Mexico reached 54.3 GW producing 257.8 TWh of which 49.2% was natural gas combined cycle plants, 20.4% oil and gas based thermoelectric plants, 12.3% coal, 10.6% hydro, 4.6% nuclear, 2.4% geothermal, 0.7% wind and 0.005% solar [96].

By the end of 2014, Mexico worldwide rank is the 21st position concerning wind-installed capacity. It has increased from 85 MW in 2008 to 2987 MW by mid 2015, of which 64% are under the so called self-generation societies, 17% under the figure of independent producers, and 16% for exporting [2].. Currently, 5900 MW are under construction and it is expected to reach 8890 MW in 2016 (Table 2). The National prospective estimates 15,500 MW of installed wind power capacity by the year 2027 (out of 21,000 MW from renewable power), which represents a growth rate of 500% compared to 2013. Mexican wind energy potential estimation is around 87 GW [97].

3.3. Wind power in the Isthmus of Tehuantepec

3.3.1. The Tehuantepec Isthmus

The Tehuantepec Isthmus is located at the narrowest distance in Mexico, between the Gulf of Mexico and the Pacific Ocean. Most of the Isthmus is sited in Oaxaca, one of thirty-two states in the Mexican Republic. Oaxaca represents 4.8% of the country's surface with 3.8 million inhabitants (3.3% of the national total) [98]. This state is one of the poorest and most marginalized of the country. According to the National Measures of Poverty in the year 2014 [16,99,100], 67% of Oaxaca's inhabitants live in poverty and 28% in extreme poverty. 27% of Oaxaca's population did not finish primary education, 20% do not have access to health security, and 78% do not have access to social security. There is also a 60% with lack of basic housing services, such as access to water services, sanitation and to electricity. In addition, around 52% of the population lives in rural and isolated areas in small communities with less than 2500 inhabitants, where 53% use fuel wood as the main fuel for cooking, The state's GDP per capita is roughly US $4200 and 60% of the population is living with a daily income of less than US$8.28 [100,101].

Table 3
Moderate to Excellent wind resource at 50 m according to NREL-SENER.
Source: Elliot et al. [102].

Wind Resource Utility Scale	Wind power at 50 m W/m^2	Wind speed at 50 m m/s	Total area	Percent windy land	Total potential capacity MW
Moderate	300–400	6.1–6.7	2.234	2.4	11,150
Good	400–500	6.7–7.3	2.263	2.5	11,300
Excellent	500–600	7.3–7.7	1.370	1.5	6850
Excellent +	600–700	7.7–8.5	1.756	1.9	8800
Excellent ++	> 800	> 8.5	1.248	1.4	6250
Total			8.870	9.7	44,350

Because of its geographical position, Oaxaca, and especially the Isthmus of Tehuantepec has a very large wind power potential. The US National Renewable Energy laboratory [102] estimation is around 44 GW wind power potential for the region (Table 3).

3.3.2. Current wind power installed capacity in the Isthmus of Tehuantepec

In 1994, CFE began to operate its first wind park in Mexico: *La Venta*, in the municipality of Juchitán de Zaragoza. The park contained seven wind turbines of 225 kW in an area of 1.8 ha [103]. By 2007, the second phase *La Venta II* began operations. This wind project was financed by the World Bank, under the *Wind Umbrella Carbon Finance Project* and consists of 98 wind turbines with a total nominal capacity of 85 MW[1] [104]. Until now, these are the only public owned wind farms in the region. By August 2015, there are over 2000 wind turbines (operating or under construction) in

[1] La Venta I and La Venta II, the only wind parks for public service.

Table 4
Wind projects in operation and under construction in Oaxaca by municipality [2].

Municipality	Number of projects	Number of wind turbines	Capacity MW	Authorized generation GW h/year	Investment Thousand US dollars
Asunción Ixtaltepec[a]	3	214	250	1103	499
El Espinal	3	198	386	1590	772
Ixtepec	1	5	15	42	30
Juchitán de Zaragoza	10	947	1357	4521	2709
Santo Domingo Ingenio[a]	6	421	618	2130	1237
Unión Hidalgo[a]	2	221	228	842	455
Asunción Ixtaltepec[a]	3	214	250	1103	499
Total	25	2006	2854	10,228	5702

[a] Some of the projects share territory with *Juchitán de Zaragoza.*

the Isthmus of Tehuantepec in Oaxaca distributed in seven municipalities, with a total capacity of 2854 MW, and a total investment of almost six million dollars [2] (Table 4).

4. Social implications of wind energy in the Isthmus of Tehuantepec

Wind energy development in Oaxaca has been characterized by different social conflicts since the installation of the first turbines. These problems are found in several notes of national newspapers [105–108], technical reports, and scientific papers [66,103,104,109–127]. In this section, a literature review of social implications of wind projects in the Isthmus of Tehuantepec is developed based on the category division presented in Section 2. Lastly, the literature review is reinforced with Constellation Analysis results.

4.1. Socio-environmental implications

4.1.1. Landscape, noise and shadow flicker

Wind turbines in the region have already become prominent features of the landscape (Fig. 2) and due to the large wind potential this visual effect will increase. According to Pasqualetti [66], the planned development in the Tehuantepec Isthmus in Oaxaca would create the largest concentration of wind turbines in the world, more than 5000 hectares of land have been reserved by 2010 in the windy municipalities of Juchitán de Zaragoza, Union Hidalgo, El Espinal, and San Dionisio del Mar. There is no specific case studies on population perception towards wind turbines in the region so far, but it has been recognized in the literature, as one of the population's concerns [66,116,117,124].

Regarding noise, there is no (public) scientific study on noise annoyance by wind parks in Oaxaca; however, it is also one of the major concerns of local residents about wind energy development [106,108,110]. The Mexican Comission for Dialog with Indigenous Peoples (CDPIM) [110] also reports concerns on noise effects over cattle. The Mexican regulation on noise disturbance considers a limit of 50–55 dB in residential areas, depending on daytime [128].

Concerning shadow flickering, there are no studies or reports on complaints on this matter. However, it is important to highlight that there is no regulation on distance of turbines from residential areas in Mexico. The currently withdrawn guideline project from the Ministry of Environment PROY-NOM-151-SEMARNAT-2006 contained general technical specifications for distances between wind turbines and other land uses (e.g. natural protected areas, aviation and radar facilities) but none from urban areas [129–131].

Fig. 2. Wind park in the Tehuantepec Isthmus. Photo by María Elena Huesca Pérez.

4.2. Socio-economic implications

4.2.1. Economic development and employment

On one hand, economic development and increased employment can mainly observed during construction stage. The operation of 14 wind projects in the Isthmus of Tehuantepec employed approximately 300 people [124], which represents an average of one job per three turbines. According to several authors [113,114,116] employments are small and not well remunerated for local population.

On the other hand, negative economic effects of wind projects in the region have been reported, such as impacts on agriculture and livestock soil due to the construction of roads and platforms, which represents loss of traditional economic activities in the lands like seasonal harvesting [114,124].

Socio-economic indicators of the municipalities with wind development are presented in Table 5 and Fig. 3. El Espinal is the municipality with higher quality social indicators; but, in general, the socio-economic status of the population presents singular deprivations. From 2000 to 2010, the municipalities with wind projects have not reduced their marginality rate; and, in the case of La Ventosa y Santo Domingo Ingenio, the rate increased from middle marginality to high marginality [100,124]. Some authors [114,115,132] also reported that wind projects in the Isthmus of Tehuantepec have created disparity among landowners with lease agreements and those without agreements, and as well with the rest of the local population.

4.2.2. Ownership, land use rights and lease agreements

Private developers set lease agreements with landowners. Most of the land in Mexico, and especially in Oaxaca is based on social ownership called *ejido*. While 54% of the National territory belongs to an *ejido*, this number raises to 91% in the Oaxaca state [133].

Table 5
Socioeconomic indicators of poverty in municipalities with wind energy projects in Oaxaca (2010).
Source: [99,101].

Municipality	Total	In poverty	In Extreme poverty	With educational lag	Without health services	Without social security	Without quality and spaces in dwelling	Without access to basic services	Without enough access to food	With income less than welfare line	With income less than minimum welfare line	No piped water	No electricity	Fuel wood as the main fuel
		%	%	%	%	%	%	%	%	%	%	%	%	%
Asunción Ixtaltepec	14,014	54.4	10.8	30.9	44.6	71.1	16.0	30.1	15.5	56.8	19.9	6.2	2.2	26.1
El Espinal	10,949	32.4	3.8	17.5	20.7	48.9	6.7	7.0	13.6	36.5	9.3	–	2.5	8.0
Juchitán de Zaragoza	79,197	60.2	11.3	27.3	42.3	76.8	25.7	11.1	17.1	62.9	21.4	9.5	1.7	22.1
San Dionisio del Mar	5564	85.9	46.0	40.8	65.0	80.2	32.7	84.3	35.7	86.9	54.8	26.7	8.1	78.8
Santo Domingo Ingenio	7342	60.6	9.5	28.0	35.0	74.8	22.9	22.6	10.5	62.8	19.7	7.7	2.6	23.2
Unión Hidalgo	8332	54.4	11.8	17.8	39.0	63.2	21.8	10.3	15.3	59.5	24.2	8.1	1.2	20.9
Oaxaca (thousand)	3809	67.4	29.8	30.3	39.9	79.7	34.1	58.7	26.6	68.6	36.8	29.2	4.4	49.3
Mexico (thousand)	112,336	46.6	11.3	20.7	29.7	60.7	15.2	22.9	24.8	52.0	19.4		1.8	14.0

The *ejido* is a legal form of community land created after the Mexican Revolution in the year 1917, which states that a group of peasants or *ejidatarios* had the perpetual rights of a specific area for agrarian purposes, but with the prohibition to sell [134]. In 1992, the Mexican Constitution was reformed, and the *ejido* land was allowed to be transformed into individual rights, which permits them to be sold, rented or mortgaged through financial contracts [135–137]. Nevertheless, there are many lands still belongs to the *ejidos*. According to the law, the *ejido* has representatives (*comisariado ejidal*) elected in an Assembly, and decisions on land such as leasing have to be approved by the majority of the members of this Assembly. Some documents report that false Assembles are arranged in order to sign faster lease agreements between the *ejidatarios* and the wind companies, which reveals illegality and corruption [108,110,124,125]. Also, private wind companies have promoted the legal modification of the property rights from *ejido* to private land, in order to facilitate the installation of wind farms [125,138].

In addition, the leasing contracts are in general 30 years term with the expectation to be prolonged, and the fees are substantially low compared with similar projects in other countries. Some lease payments in Oaxaca are estimated annually between US$98 to US$360 per hectare depending on the affectation. Royalties go from 0.025–1.53% of gross income [66,108,115,125]. Public projects fees are similar, such is the specific case of La Venta, where lease payments are between US$114 and US$456 per year per ha[2] [114].

4.2.3. Economic chains and Clean Development Mechanism

Most of the wind projects in the country have been financed by the Clean Development Mechanism (CDM), one of the instruments of the Kyoto Protocol, and in the case of Oaxaca, by the year 2014, 20 out of 23 wind projects are supported through this policy [131]. Contrary to the case of Brazil, where wind turbine manufacturing has created economic chains with positive impacts in the country, México has no wind turbine manufacturing, which permits a high rate of wind technology import [131,139]. According to technology transfer research in wind energy projects supported by CDM, countries with no domestic wind industry have a lower rate of wind power growth [140].

4.3. Socio-cultural

4.3.1. Socio-cultural values and rights of indigenous people

There are 62 ethno-linguistic peoples and communities in the country, and Oaxaca is one of the states with higher indigenous diversity (47%), thirteen indigenous peoples and communities are officially recognized: *Amuzgo, Chatino, Chinanteco, Chocho, Chontal, Cuicateco, Huave, Ixcateco, Mazateco, Mixe, Mixteco, Triqui y Zapoteco* [141]. In 2010, 34% of the state population spoke an indigenous language (*Zapotecas* 40%; M*ixtecas* 28%; M*azatecos* 19%; *Mixes* 13%). Each community has its own customary law called *usos y costumbres* recognized by the state Constitution where the Assemble is the participatory decision-making foundation. By 2010, Juchitán de Zaragoza (where most wind parks are built) was one of the municipalities with the highest indigenous presence in the country (86%). Besides poverty, education is a critical factor: 25% of indigenous people in Oaxaca are illiterate (while 16% of the total state population), and 16% is monolingual with no Spanish knowledge [141].

In order to guarantee indigenous rights, Mexico undertook ratification in 1990 with the International Labour Organization

[2] Between MXP$1500 and MXP$6000 with exchange currency into US Dollars in 2010 of MXP$13,15.

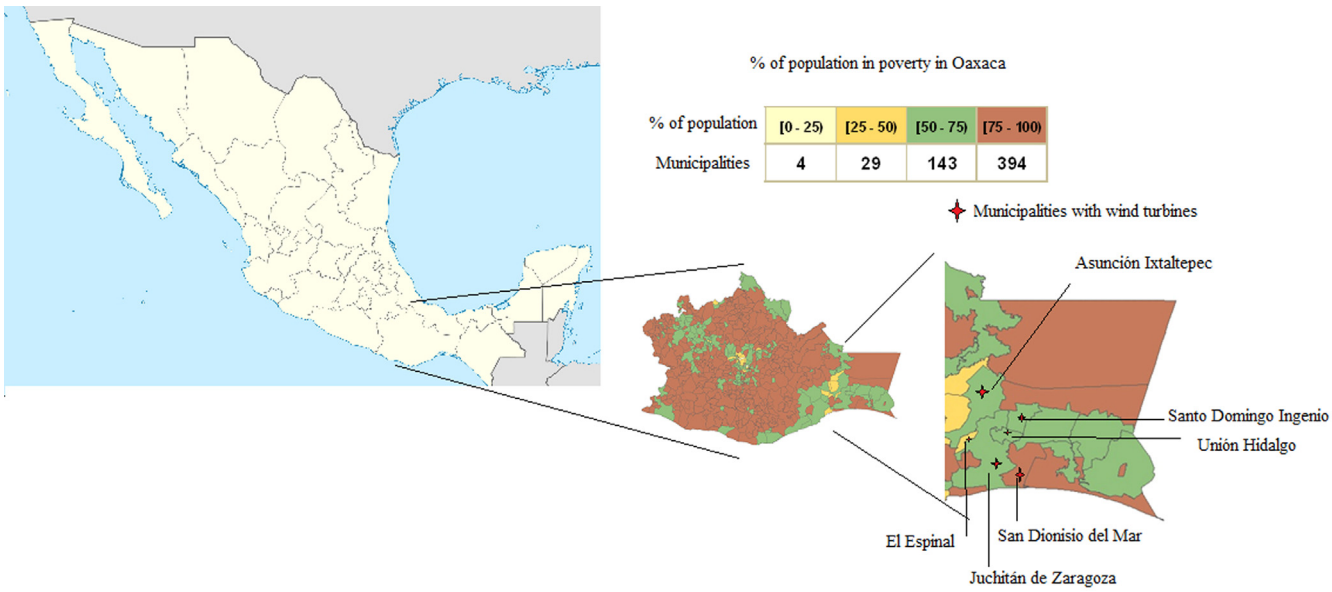

Fig. 3. Municipalities with wind energy turbines in Oaxaca.
Source: [2,101].

(ILO) Convention 169 [79]. In 2004, ILO's supervisory board requested from the Mexican government to ensure full participation of indigenous communities, emphasizing its responsibility to ensure their right to participate in the process of productive land use and resources, as well to ensure the implementation of the Convention [68,142]. In 2001, indigenous rights were introduced in the Mexican Constitution in Article 2, giving more rights to the community, e.g. deciding about their own economical, political and cultural organization, enriching their own language and culture, and preserving and improving their land and natural resources [143].

Conflicts about energy deployment on indigenous territory are very common (e.g. hydro-electrical industry in Oaxaca, Veracruz and Guerrero) [143]. In general, the main issue is due to lack of timely and comprehensive information as well as prior consultation, which contravene the ILO Convention 169 [125]. Opposition to wind farms in Oaxaca has been marked by the importance of socio cultural values related to the indigenous peoples and communities. As Pasqualetti [66] quoted, the discourse of one of the opposition groups has called on its supporters to “defend the land we inherited from our ancestors” and to say “no to the wind energy megaprojects in the Isthmus that desecrate our lands and cultural heritage” [105].

4.4. Stakeholders involvement: information, consultation, and participation

Social conflicts among some population groups and wind farm developers have been created mainly because of an improper framework of information, consultation and participation [124–126].

According to the General Environmental Law (LGEEPA), any person can ask for public consultation and, in case of serious damage of the environment, a public meeting for the project's information can be arranged; unfortunately, the project managers can keep this information due to industrial property reasons [144]. People in the Isthmus of Tehuantepec have argued there are substantial environmental impacts not only on birds and noise, but also on underground water, negative effects on food sources, and wetland destruction [106,115,132]. Concerning access and public participation, the Federal Law of Transparency and Access to Governmental Public Information compel the SEMARNAT to give access to information regarding permissions given throughout EIA. The EIA is an instrument with the potential for public involvement; however, its shortcoming in Mexico is not only because public participation is limited, but also because there is no external monitoring [145].

According to several authors, wind farms in the Isthmus of Tehuantepec have accentuated inequalities and generated a conflict that not only threatens wind development but the social stability in the region [114,124,125].

4.5. Constellation analysis of the “Piedra Larga” Wind Park

The aim of this section is to present a qualitative result of a case study developed in one of wind projects sited in the Isthmus of Tehuantepec. This empirical research shows the conflicts of a wind project from the landowner’s perspective. The case study reinforces and enriches the information presented in this paper, giving a local visualization of a specific wind project in the Isthmus.

The study was based on a park with 11 wind turbines of an installed capacity of 90 MW. The project was financed with the support of the Clean Development Mechanism (CDM) and started operations in 2012. It is sited in a private owned land of 756 hectares (of which, 26 are for infrastructure) in Piedra Larga in the municipality of Union Hidalgo in the Isthmus of Tehuantepec. A second wind park also with CDM support is under construction in the same area [146].

The evaluation was conducted through Constellation Analysis (CA) [147,148] developed on a semi-structured workshop in which participated four of the land-owners who have a lease agreement with the wind company. The data was gathered during the workshop where all the landowners could hear other's comments. The workshop was conducted in March 2014, as part of a wider case study research. Further research work must be done in order to find out other significant aspects of the wind energy development in the region.

The resulting constellation diagram (Fig. 4) summarize the vision of the participants and help to understand the complex field of actors and interactions divided in *social and institutional actors* (yellow), *natural elements* (green), *technical elements* (blue), as well as *system of regulations, incentives, laws, among others* (red). The

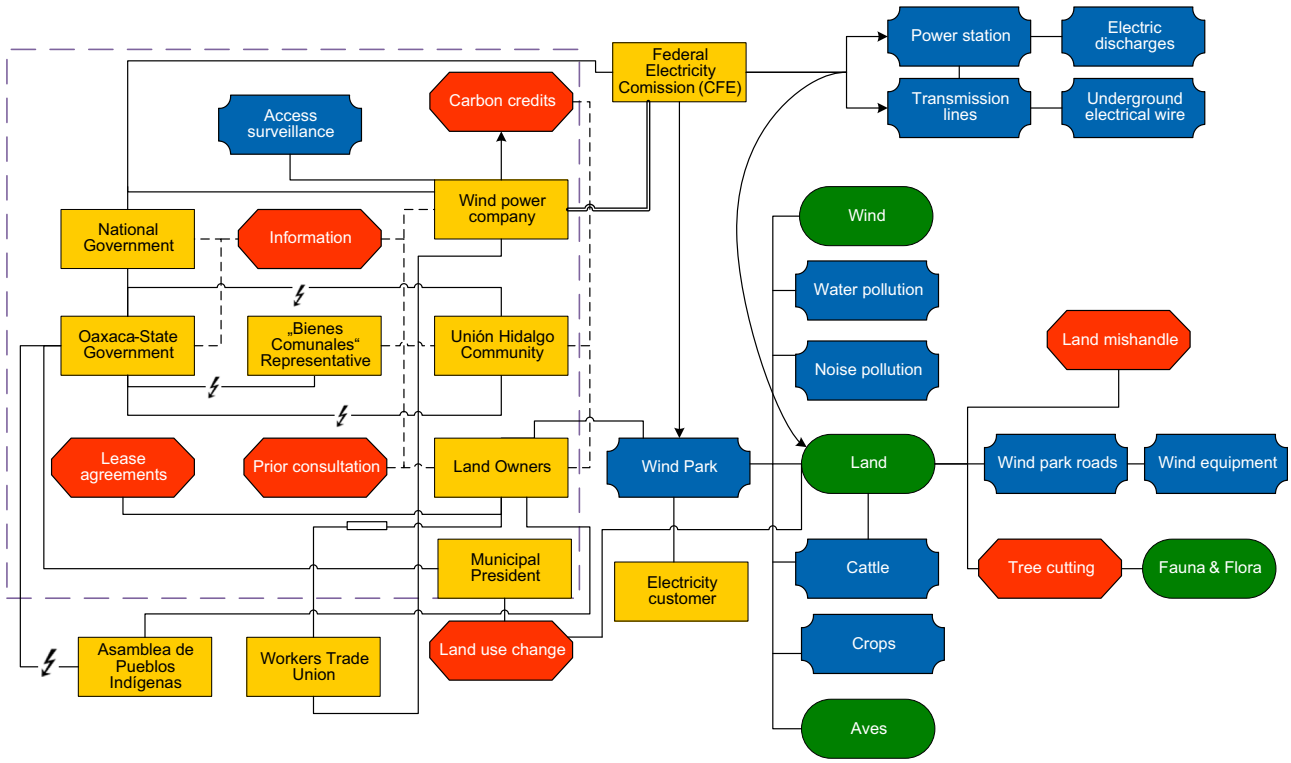

Fig. 4. Constellation analysis diagram.

different elements are characterized by different colors and graphical representations, with their respective relations, as well as the diverse possible interactions, which are differently represented.

The CA diagram (Fig. 4) shows the main considerations from the participants in this evaluation; the analysis is carried out concerning the socio-environmental effects from private large wind parks in the area. The area deals in the last years with different conflicts within the wind energy development, resulting on a growing opposition. In this specific wind park development the conflicts over the project emerged since the very beginning, with the new *wind park roads* and early infrastructure's construction. In general, people from the community got startled to see the first wind turbines, as they argued there was none *information* before the project has started. On one hand, the *multilevel government* in Mexico as well as the multiple stakeholders results in a complex *top-down planning* process of a wind park. (See Section 3.1 Regulation).

The *national government* through *Federal Electricity Commission (CFE)* and CRE are responsible to give the permit to a large *Electricity Customer (for self-generation)* for building a private wind park; however, is the local government, the *Municipal President*, who approves the *land use change* (from agricultural to industrial). There is also a complex process of actors as well as a conflictive relation between all levels of authorities. The *national, regional* and *local government* has a good relation with the *wind company*; in contrast with the civil society, they have not been supportive with the *community* ‘concerns and *information* to the local people, who are in majority *indigenous peoples*. In addition, the wind company has placed *surveillance access* to the wind parks ‘roads, which has been an upset for the local people in general. Proper *information* and *prior consultation* is essential for the local communities before the project has begun, this basic step has failed, contributing to raise an *opposition* from local residents to the second stage of this wind park and future projects in the area, leaded by the *Asamblea de pueblos indígenas* (officially called Asamblea de Pueblos Indígenas del Istmo de Tehuantepec en defensa de la tierra y el territorio APIITDTT).

On the other hand, the participants consider the *wind* as a local resource to be used for the local benefit. The land owners´ concerns about the *wind park* and land management are mainly concerning the *impacts to the environment*: a) *land mishandle* from the new *roads* infrastructure and *equipment* handling, b) *tree cutting* without prior notice, and therefore local *flora and fauna* affectation, c) *water pollution* due to improper turbines oil waste management, and therefore negative effects on the crops, d) *noise pollution* because of the proximity with urban areas, e) *cattle* disturbance by shadow flickering. Most of the complaints were about the *land* and how it has been used not only for the wind turbines but also for the *transmission lines, underground electrical wire* and *power stations*, which people consider a substantial issue when it comes to the increasing rate of wind parks in the area over the last years and their long-term effects in the future, or cumulative effects (argued as well in the discussion group).

There are also some *impacts on the society/community*, which comprises mainly complains from the *land owners* regarding land property and their respective *lease agreements*. The land lease contracts are perceived with lack of transparency and openness to the landowners and specially the whole *Union Hidalgo community*. According to the discussion group, there are approximately 1000 members of this community, which not all have a land agreement although they are part of the community and they used the leased land. The lease contracts contain assorted conditions and tariffs, which gives the people a perception of an unfair process.

Last but not least, one of the main referred reason of the upcoming wind projects opposition is that the *wind company* and all levels *government* are missing their responsibility of giving *information* and an effective *prior consultation* of the project to the civil society, moreover to the indigenous communities in the area. There is a warning concerning the ILO Convention 169, which

protects indigenous peoples to their rights to participate and to be consulted, then the concept of '"Free, Prior and Informed Consent" is fundamental for indigenous rights in this type of renewable and sustainable projects [80]. This analysis is especially important in the context of international environment policies, specially CDM, which has been widely applied in Oaxaca to finance wind parks. In own words of the participants, the *carbon credits* are not a benefit for the communities but for the companies. As shown in the CA, the top-down planning approach has caused local opposition as a response to the *limited public participation* of stakeholders and all civil society.

Essential findings:

The multilevel government in Mexico as well as the multiple stakeholders result in a complex top-down planning process of a wind park.

Concerning about environmental and social impact, long term effects on the environment (birds, cattle, soil, underwater, noise) as well as on the society/community (land property and lease agreements).

One of the opposition arguments is that the wind company and all levels of governments are missing their responsibility of giving information and provide an effective consultation of the project to the civil society, and to the indigenous communities.

Further considerations:

The role of the Environmental Assessment (EIA & SEA) concerning impacts monitoring, mitigation and compensation measures.

The role of international organizations and their environmental policies to contribute to the sustainable development.

5. Discussion and conclusions

The growth of wind power has been exceptional in the last decade in the world, but it has been accompanied with opposition of local residents. This paper proposes four areas for the evaluation of social impacts of wind power: socio-environmental; socio-economic; socio-cultural and stakeholder involvement. A review of literature on these four areas shows that regulation, guidelines for best practices and institutional involvement are crucial to reduce the social impacts, but an important number of studies also show that even in the cases of landscape and noise annoyance, the perceptions of the local dwellers to wind farms varies depending on the distribution of economic benefits, participation in the decision-making process and ownership.

Wind energy potential in Mexico represents more than twice as much as the current total power installed capacity, so the possibility of an increase of wind farms is very large. Meanwhile, the Isthmus of Tehuantepec has a greater potential, it is also a socially disadvantaged region. Wind energy development in the Isthmus area has been characterized by different social conflicts since the installation of the first turbines. The paper shows that wind projects in this region have grown with lack of sufficient regulation, an absence of institutional mediators, and insufficient instruments that promote a fair distribution of benefits. This has led to an increase of inequalities and has promoted social conflicts in the region [114,124,125].

Engaging participation of the local communities (from economic benefits to decision making) as well as recognizing the cultural values are unavoidable conditions for its development. To promote this participation, the following outlook is under discussion.

5.1. On-site participatory planning

A participatory planning process could lead to a more equitable development [149,150], and might help not only to reduce social conflicts towards wind energy, but to allow understanding the concerns, needs, and even limitations of wind energy in the region. Since the first step of a wind project is site selection, information from the site is mandatory. In the case of the Isthmus region in Mexico, the main issue is regarding participation within stakeholders and civil society, who mainly are indigenous peoples. A special treatment must be done in order to engage all sectors of society, and also to engage to the principles of consultation and participation of the ILO Convention 169. Culturally sensitive consultation is key for engaging indigenous communities [104], with clear and proper information, also in different languages. Such a susceptible topic needs a number of individual resolutions, due to the diversity of indigenous people. Main issues concerning wind parks in the Tehuantepec Isthmus have demonstrated limited participation, which also shows the importance of legal representation through the land lease process [39,151].

5.2. Public policy for sustainable renewable energy development

Mexico needs to build a more comprehensive public policy for renewable energy that considers national, regional and local goals in a more sustainable path of development. Public policies are needed to promote community ownerships, social and public investments, science, technology innovation, economic chains, and policies for regional development that create synergies and respect cultural values, in the vision of green economies promoted by the Rio + 20 UN declaration.

5.3. Governance and regulatory institutions and instruments

The complex and contentious process of wind energy planning in Mexico has been a consequence of a top-down decision with a weak institutional framework. On one hand, the main issue is due to multi-level government and, wind energy planning being held as a complete federal responsibility, while the regional (Oaxaca State) and local authorities (municipalities) have minor or no participation in the process. On the other hand, the state and the municipalities are the ones directly confronted with the social problems at wind parks site. Although there is a national importance of increasing wind power capacity, there is a struggle of suitable regulations on the local level.

There is an urgent need in Mexico to develop mandatory regulations and guidelines that reduce and mitigate social-environmental impacts, a close coordination between all levels of government [125]. For example, regulations that establish minimum distance of wind turbines to populations, density of wind farms, height of the turbines, noise, etc. Other regulations such as land use planning with a participatory planning process are also important as explained above, specially policies that mandates participatory governance across multiple levels for policy implementation [152]. Also, guidelines that provide valid source of information to land owners for fair lease agreements could be highly useful. It is also urgent to create a regional governmental agency that includes different level of governments and guarantees the promotion of sustainable regional development, participatory process and advisory for local communities.

The challenge of environmental assessments such as EIA (as well as Social Impact Assessment and Strategic Environmental Asssessment), as regulatory instruments, is integrating multiple stakeholders and socio-environmental factors within wind power projects as well as diffusion of information outside the project. An adequate and effective application of the current EIA based on local consultations, might anticipate and mitigate conflicts (in a project level). EIA is also important for monitoring the effects of impact assessment, which their effectiveness can then provide

guidance for further wind energy projects and final decision-making [153].

Learning from previous experiences is key to manage future development. Further research on the local level will help to understand public attitudes and performance of social acceptance, as well as to learn lessons from previous experiences within siting wind energy deployment in unprivileged regions, like the Isthmus of Tehuantepec wind corridor.

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Chapter IV

From global to local: impact assessment and social implications related to wind energy projects in Oaxaca, Mexico

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From global to local: Impact assessment and social implications related to wind energy projects in Oaxaca, Mexico

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Abstract

In order to forecast likely impacts, Environmental Impact Assessment (EIA) has been applied worldwide. There are numerous social and cultural impacts that can hardly be addressed in a single EIA, and raise the awareness of social issues and proper assessment therein. This paper analyses the social conflicts related to wind development projects in the Isthmus of Tehuantepec, Mexico using a qualitative approach. By conducting a Constellation Analysis (CA) in our case studies, this article aims at: 1) Identifying the challenges and improvement opportunities for the social and environmental assessment of wind energy projects in Oaxaca, and 2) presenting CA as a novel approach to visualize and identify social and environmental issues. This paper emphasizes the relevance of earlier assessment of social implications to projects. This example can contribute to a better understanding of further research at Mexico's regional and national levels, as well as in other regions or countries with similar development patterns.

Abbreviations: CA: Constellation Analysis; CDM: Clean Development Mechanism; CFE as in Spanish: Federal Electricity Commission; CIC: Community Interest Company; EIA: Environmental Impact Assessment; ESF: Environmental and Social Framework; FPIC: Free, Prior and Informed Consent; IFC: International Finance Corporation; ILO: International Labour Organization; LGEEPA as in Spanish: General Law on Ecological Balance and Environmental Protection; NEPA: National Environmental Policy Act; PDD: Project Design Document; SEMARNAT as in Spanish: Secretariat of Environment and Natural Resources; SENER as in Spanish: Secretariat of Energy; SIA: Social Impact Assessment; UNFCCC: United Nations Framework Convention on Climate Change; WB: World Bank.

Keywords: *environmental impact assessment, social impacts, wind energy, Mexico*

Introduction

The worldwide efforts to climate change mitigation have driven the development of renewable energy resources. The UN Framework Convention on Climate Change (UNFCCC), Kyoto Protocol, and their instruments, such as the Clean Development Mechanism (CDM), have stimulated the development of renewable projects in several low and middle income countries (Paris Climate Change Conference 2015; Lloyd and Subbarao 2009; Lau et al. 2012). In this context, industry-scale renewable energy projects such

as wind and solar farms, have increased all over the world. Despite the importance in reducing greenhouse gas emissions by substituting fossil fuel combustion, renewable energy projects are beset with implementation difficulties due to social impacts in several countries (Stigka et al. 2014; Batel and Devine-Wright 2015; Huesca-Pérez et al. 2016). Additionally, there were a considerable amount of criticisms on the effectiveness of the instrument and the characteristics of applying different CDM projects (Benecke 2009; Lederer 2011; Böhm et al. 2012; Corbera and Jover 2012; Ervine 2013; Phillips and Newell 2013; Gartman et al. 2014; Reinecke et al. 2014).

Social aspects of Environmental Impact Assessment

Environmental Impact Assessment (EIA) is a process that assists in ensuring that possible significant direct and indirect effects of a project are identified and considered before implementation (IFC 2012; Therivel and Wood 2018). The EIA shall identify these effects on various elements: a) population and human health; b) biodiversity; c) land, soil, water, air, and climate; d) material assets, cultural heritage and the landscape; e) the interaction between the receptors (OJ 2014). In the year 1970, EIA was first legally established in the United States of America (U.S.A) through the National Environmental Policy Act (NEPA). Since then, EIA has been adopted and ratified, giving it legal force, in many countries (Wood 2003). Although EIA started as an environmental instrument, it is increasingly seen within a broader context of promoting sustainability, especially involving social impacts (Jay et al. 2007; Glasson et al. 2013), in projects and policies (Dendena and Corsi 2015a).

There are numerous social and cultural implications that are difficult to address in a single EIA, which raises the awareness of the lack of assessment for social issues. The social dimension of impacts involves all probable impacts to people´s wellbeing, including environment, land, community, livelihoods, and culture (Smyth and Vanclay 2017). There are measurable socio-environmental impacts of wind energy, e.g. noise pollution as a disturbance on human health (Henningsson et al. 2013); or even landscape disruption (Nadaï and Labussière 2013). The socio-cultural dimension is more challenging to enumerate. Culture identifies communities and some of them have a strong attachment to their tangible (e.g. archaeological sites) and intangible cultural heritage (e.g. language, music, art) which should be protected and considered in project planning (Smyth and Vanclay 2017). Integrating community perceptions and cultural diversity can address the concerns of indigenous communities and incorporate their local knowledge, thus improving the understanding of mitigation measures and fair compensations plans. (Nzeadibe et al. 2015; Hanna et al. 2016).

Some authors argued that since social awareness is not the main objective of EIA, an improper incorporation of social issues within the EIA might lead to public opposition (Esteves et al. 2012; Larsen et al. 2015). There is also the uncertainty that participation processes within EIA can fully cover requirements on social issues. Larsen et al.´s (2015) research in Denmark found an insufficient treatment of social impacts within EIA, however, the authors concluded that if practice were improved EIA in Europe could address social impacts in one integrated assessment.

Social Impact Assessment (SIA) has evolved in the last decades, as part of the same EIA or as an independent process or parallel tool. The SIA "*is analyzing, monitoring and managing the social issues associated with planned interventions"* (Vanclay 2003 p.5). It can be an effective mechanism in an international context for example, where no legal regulation is available at the national level, or as a planning tool for improving business benefits and to assist the proponent's decision-making process (Vanclay 2003; Esteves et al. 2012). Involving the public in the decision-making process of planning has become increasingly beneficial worldwide. A good practice on SIA involves a participatory process and understanding of the local community, which facilitates agreement-making processes, increases public participation and ensures participation of vulnerable people (Esteves et al. 2012). Public involvement must be an integral part of SIA (Barrow 2000) and participation should take place in earlier stages of the planning process. However, the scope of the assessment should be a responsible learning process and also depends on the combination of evaluation, education, and participation itself (Barrow 2000).

SIA methods are applied worldwide by multilateral financial institutions. The World Bank (WB) is a forerunner concerning social effects and guidelines of early consultations for indigenous peoples in EIA projects (Roberts 2006; Dendena and Corsi 2015a). Since 1980, the WB has been assessing the social impacts of involuntary resettlement by their financed projects, and in 1984 they were addressing indigenous peoples in bank policy (Beddies 2011). The International Finance Corporation (IFC) sets compliance levels followed by most international financing organization, e.g. guideline requires to obtain the "Free, Prior and Informed Consent" (FPIC) in case of indigenous peoples involvement and land rights or access to land (IFC 2012). In 2016, the WB board approved a new Environmental and Social Framework (ESF), which broaden the scope of applications of the *Environmental and Social Safeguard Policies*. It was expected to go into effect in early 2018. The environmental and social standards are mandatory requirements applying to WB-financed investment projects (IBRD/WB, 2017).

An elevated awareness of the relevance of SIA has been notable in emerging countries, where there is increasing investment, but also conflicts between companies and local communities due to land scarcity and weak institutions (Vanclay et al. 2015). Therefore, it is important to consider the cumulative dimension of impacts on a range of environmental, economic and social issues, both spatially and temporally (Franks et al. 2013). Assessment, management, and monitoring of impacts are fundamental when considering the effects on indigenous people (Vanclay et al. 2015). Early EIA and SIA can be important project planning instruments, in terms of final decisions and mitigation measures, especially when an integrated approach is pursued. Slootweg et al. (2003) identified three settings for a one-process integral framework for EIA and SIA: biophysical (natural environment), social (human), and the institutional setting. Such an integrated assessment shows a wider and more profound framework of the variety of impacts.

Whereas a legal framework in most countries supports EIA, SIA is not commonly legislated worldwide. In some selected cases, a social assessment was required in order to approve a project. In Queensland, Australia a *Social Impact Management Plan* is needed as part of the EIS; in South Africa, *Social and Labor Plans* are mandatory for mining projects, as well as in the Philippines a *Social Development and Management Program* is required also for mining projects (Vanclay and Esteves 2011; Esteves et al. 2012).

Wind energy development in Mexico and Impact Assessment

Until December 2013, electricity generation in Mexico was reserved to the state-owned utility called the Federal Electricity Commission (Comisión Federal de Electricidad – CFE). The energy reform in 2013 successfully introduced structural changes and allowed the participation of large private firms in the national power sector (Alpizar–Castro and Rodríguez–Monroy 2016). The energy reform has a direct impact on a long-time conflict concerning the land tenure (Baker 2016). There are several regulations in Mexico that have the objective to promote renewable energies, such as General Law of Climate Change, Law of Energy Transition, and the Climate Change National Strategy (DOF 2008; DOF 2012; DOF 2015).

In January 2016, the total capacity of wind energy in Mexico was 2,800 MW in 32 wind energy farms, of which 23 are sited in the Oaxaca state (SENER 2016). The Oaxaca state and especially the Isthmus of Tehuantepec has been a major hub in the wind energy development due to its extraordinary wind power potential (Elliott et al. 2003). Most of the wind parks in the Tehuantepec region have been supported by

CDM and international development agencies (e.g. WB, Inter-American Development Bank) (Gartman et al. 2014). It is important to state that Oaxaca is one of the poorest and most marginalized states in the country. In 2016, 70% of Oaxaca state inhabitants lived in poverty, and 27% in extreme poverty (CONEVAL 2016). Moreover, 47% of the state´s population have an indigenous background, making it one of the states with highest indigenous diversity in the country; with thirteen official indigenous communities (Huesca-Pérez et al. 2016).

Legal framework of social issues in environmental assessment

Mexico's first environmental law applying EIA appeared in 1977 for hydraulic infrastructure. However, in 1988 the General Law on Ecological Balance and Environmental Protection (LGEEPA abbreviation in Spanish) came into force and applied specifications for developers (Barrow 1997), and in 1996 committed to improving public participation (Weidner 2002). There is actually no specification concerning social aspects; the only mention of human-related impacts in the LGEEPA is that an EIA is required for projects or activities affecting human health (Art. 28, XIII); however, is not clear what it covers. In general, noise, vibrations, air, and visual pollution are subject to prevention and mitigation measures (Art. 155,156). There is a general regulation concerning cultural aspects, like archaeological sites and historical monuments (tangible) and areas with indigenous heritage (intangible), but only applied for protected natural areas (Art. 45, VII), and not strictly compulsory for EIA. Furthermore, the resolution of EIA from the environmental authority is limited only to the environmental aspects (Art. 35) (DOF 1996). The *Environmental and Social Safeguard Policies* have been the mechanism for addressing environmental and social issues in WB financed wind energy projects in Mexico (Ledec et al. 2011).

As for public participation, according to the Mexican regulation of EIA (DOF 1996; DOF 2014), a public EIA consultation is actually not a mandatory process (Article 41 of the EIA regulation). Citizens can request a public consultation within 10 days of a project's publication and a public hearing within 25 days if major environmental or public health hazards are likely. This participation process is conducted by the environmental authority (SEMARNAT) and it is the citizen´s responsibility to request more information from the environmental authority who publishes new projects online (DOF 1996).

A new national regulation (resulting from the energy reform) establishes SIA as a requirement from the Secretariat of Energy (SENER) for the energy sector´s projects, specifically oil projects and electricity generation (DOF 2014a; DOF 2014b), and requires that an indigenous consultation is conducted

(DOF 2014). In 2017, part of the Isthmus of Tehuantepec, among other regions in Mexico, was declared an economic special zone (ZEE in Spanish), which has a new legislation of financial incentives for high productivity areas (DOF 2017).

Even though there is greater focus on social impacts, there is still a research gap concerning the assessment of social issues in environmental assessments, especially considering social disadvantages or weaknesses (e.g. indigenous groups). This paper analyses and emphasizes the relevance of the prior assessment of social implications related to wind development projects sited in the Isthmus of Tehuantepec, Mexico, throughout a qualitative approach. The aims of this paper are: 1) identify the challenges and improvement opportunities for the social and environmental assessment of wind energy projects in the Oaxaca state 2) present CA as a novel approach to identify social and environmental issues related to our case studies.

Methodological approach

For the purpose of this research, we used a qualitative analytical approach by applying a Constellation Analysis (CA) (Schön 2007) conducting focus group discussions and semi-structured interviews with relevant stakeholders (Longhurst 2016), and case study research (Yin 2014). The decision to use a Constellation Analysis was to a wide range of stakeholders with complicated relations in wind energy development in the region of the Isthmus of Tehuantepec as well as to introduce a novel, participative approach in the socio-environmental assessment. For this research, a total of 21 semi-structured interviews, five focus group discussions, and five CA workshops were conducted. Additionally, literature and official documents were reviewed regarding our case studies. The data was collected during several field research trips to the region (March 2014, May 2015) alongside meetings; interviews and workshops were held to observe previous cases from the field (see Tables 1,2,3 in Appendices). This fieldwork and workshops were conducted before the national energy reform (see discussion section). CA is an inter- and transdisciplinary tool for mapping and identifying of elements within a complex system, as well as their relations and the dynamic between them (Schön 2007; Bruns et al. 2010). In order to map relations, the components used provide a character of each element. There is no hierarchy between elements and the major focus is on the relationship between them:

- Social actors (e.g. indigenous groups, local authorities, national government)
- Natural elements (e.g. wind, landscape, wildlife)

- Technical elements (e.g. wind turbines, power stations, wind park roads)
- Signs/symbols (e.g. standards, laws, concepts, regulations)

The different elements, characterized by different colors and graphical representations, are afterward linked with each other, thus indicating relations. The diverse possible interactions are represented as follows: simple (simple line), tenuous (discontinuous line) directed (line with arrow), incompatible (crossed-out line with arrow), resistive (line with rectangle), and conflictive (line with lighting) (Schön 2007).

The resulting constellation diagram summarizes the vision of the participants regarding their own experiences with the wind energy development in the region. Different CA diagrams were developed considering our case studies: a) two cases of wind energy projects in the Isthmus of Tehuantepec; and b) the vision of academia, a wind energy company and an indigenous opposition group. The goal is to highlight the relevant elements problems and relations in the complex interaction of technology diffusion, society, and sustainability of wind projects in this region of Mexico. The characteristics of the analysed cases are summarized as follows:

- Case 1 shows the conflicts and concerns within a private wind park financed by international institutions, sited on community indigenous land. The workshop was held in March 2014 in the municipality of Unión Hidalgo, Oaxaca with the participation of four landowners, who are leasing the land to the wind company.
- Case 2 shows the institutional barriers as well as the challenges for a wind project developed by the members of indigenous community land (community wind farm). The semi-structured workshop was held in February 2014 in the municipality of Ixtepec, Oaxaca with the participation of the main promoter of the project, and three active project members.
- Case 3 are three CA for different stakeholders: 1) scientific-academic perspective held in March 2014 in Mexico and Oaxaca cities, 2) a wind energy company with interest in wind parks in the area carried out in May 2013 in Germany, and 3) indigenous peoples' opposition representatives held in March 2014 in the municipality of Juchitán de Zaragoza, Oaxaca.

Main findings based on CA

In this section, the main findings based on the CA are presented. The cases were chosen due to social

similarities (indigenous communities, land tenure conditions), despite the different scenarios (participation processes within a private wind park, and a planned community wind park). The cases are described as the CA results, and supplemented from findings from interviews and discussion groups.

Case 1. Private Wind Park and the role of international policies to contribute to the local sustainable development

The wind park "Piedra Larga I" consisted of 11 wind turbines with a total of 90 MW installed capacity. The project was financed by the WB and supported by the CDM, and it started operations in 2012. It is sited on 765 hectares of community land (of which, 26 are for infrastructure) in the municipality of Union Hidalgo in the Isthmus of Tehuantepec (SEMARNAT 2008). A second phase of the wind park "Piedra Larga II" (also with CDM support) was under construction at the same time of the workshop. In this particular case, the stakeholders were a group of community landowners holding a lease agreement with the wind company.

Figure 1 presents the diagram that resulted from the CA. The stakeholders are: *National government*, *Oaxaca state government*, *municipal authorities*, *CFE*, *wind energy companies* (developers of the wind project), *Bienes Comunales representative* (official representation of the community*), Union Hidalgo community* members, *landowners*, *indigenous peoples group*, *Workers Trade Union* (construction workers of wind park), and *electricity customers*.

As shown in Fig. 1, there is a complex relationship between different stakeholders and with natural and technical elements. In particular, participants in the CA workshop established a conflictive relation between (a) *National* and *Oaxaca state governments* concerning the provision of *information*, (b) *wind energy companies* with *landowners* related to prior *information*; and (c) *landowners* and *carbon offset* from the projects. In addition, there is an incompatible relation within: (a) The *national* and *state governments* with the *Union Hidalgo community*; (b*) Bienes Comunales´ representative* with the *state government*; and (c) *indigenous peoples group* with the *state government*. The diagram shows an alliance between *wind energy companies* and *CFE*; and a resistance relation between the *Workers Trade Union* and *landowners*.

Participants considered *'wind'* as a local resource to be used for the local benefit, and perceived they are losing their land before *wind energy companies*: 'we, the indigenous, do not know about laws or new technologies, but we do know when our land has been affected'. The *landowners´* concerns about the *wind park* are principally the impacts to the environment: a) *land* loss due to new *wind park roads* infrastructure and *wind power equipment* handling, b) *logging* without prior notice, and therefore effects

on the local *flora* and *fauna*, c) *water pollution* due to improper waste management of turbines oil and lubricants, and their negative effects on the *crops*, d) *noise pollution* because of the proximity to urban areas, e) *cattle* disturbance by shadow flickering (also from interviews 8 and 9). Other complaints were made regarding how the *land* was not only used for the wind turbines but also for *transmission lines, underground electrical wires*, and *power stations*. Locals mentioned that there was an increasing number of wind parks commissioned in the area over the last years with the respective cumulative effects not been properly evaluated (also discussion group 1). There is a general lack of trust because the participants considered inaccurate prediction of impacts in the EIA, lack of measures to decrease bird mortalities, as well as scarce public results and proper documentation e.g. monitoring of bird fatalities) from the wind park management (also discussion group 1). Furthermore, they considered inappropriate proceedings, poor practice within the EIA, and a need to review the national environmental system (from interview 20). The EIA documents stated there was no previous information to assess environmental impacts on birds (SEMARNAT 2008), and they focused then on different species affected during the construction phase (reptile, mammals, etc.) (SEMARNAT 2011). Both documents, from a two-stage wind park, suggested a detailed monitoring in the future.

The participants in the workshop pointed out significant impacts on the community, which includes mainly complaints from *landowners* regarding land property and the *lease agreements*. They considered the land lease contracts showed lack of transparency to the landowners, and especially to the whole *Union Hidalgo community*. According to the discussion group, there are at least 1,000 active members of this community and while not all have a land agreement, they are part of the community either working on the leased land or living in the proximity. They considered the different conditions and payments within the lease contracts as an unfair process. Some participants also mentioned cultural changes within the community, as "in the past, there was only a spoken commitment, no written contracts between them. Now it all has changed and one cannot trust each other anymore" (discussion group 1).

The participants considered that suitable prior *information* and *prior consultation* should have been essential for local communities before starting the project; due to the failure of this basic step, *opposition* from local residents were then raised prior to the wind park's second stage along with other future projects in the area, led by the *Indigenous people opposition group*. It is important to point out that not everyone in the region is against the wind energy development in the area, and some participants considered that they were satisfied with the monthly payment they received. Generally, residents are

unsatisfied with the wind park's management (discussion group 1, interview 8). In addition, some of the residents in the region who are not part of the wind energy development (e.g. they own land but do not lease it yet, no owning land but being part of the community) and some wished they could be partaking of the benefit sharing (Interview 7). There is - in general – limited knowledge about wind energy (technology, impacts, development, etc.) in the discussion group. Some participants considered the local universities as a possible information dissemination source (Discussion group 1).

Lastly, in words of the participants, one of the main reasons for the strong opposition in upcoming wind projects is that the *wind energy companies and* all levels *government* are missing their responsibility of giving *information* and providing an effective *prior consultation* to civil society, especially to the indigenous communities in the area. They appealed for the ILO Convention 169, which protects the rights of indigenous peoples to participate and be consulted, where the concept of 'Free, Prior and Informed Consent' is fundamental for indigenous rights regarding renewable and sustainable projects (Langbroek and Vanclay 2012; Hanna and Vanclay 2013; Hanna et al. 2016; Papillon and Rodon 2017). In 2014, Oaxaca´s government was still lacking a specific role in wind energy development, as they expected to have more responsibilities in the planning process (Interview 18).

This analysis is particularly important in the context of international environmental policies, especially with CDM as an international financing support mechanism, which has been widely applied in Oaxaca to support wind parks. CA participants felt *carbon offset* do not benefit the communities but the companies.

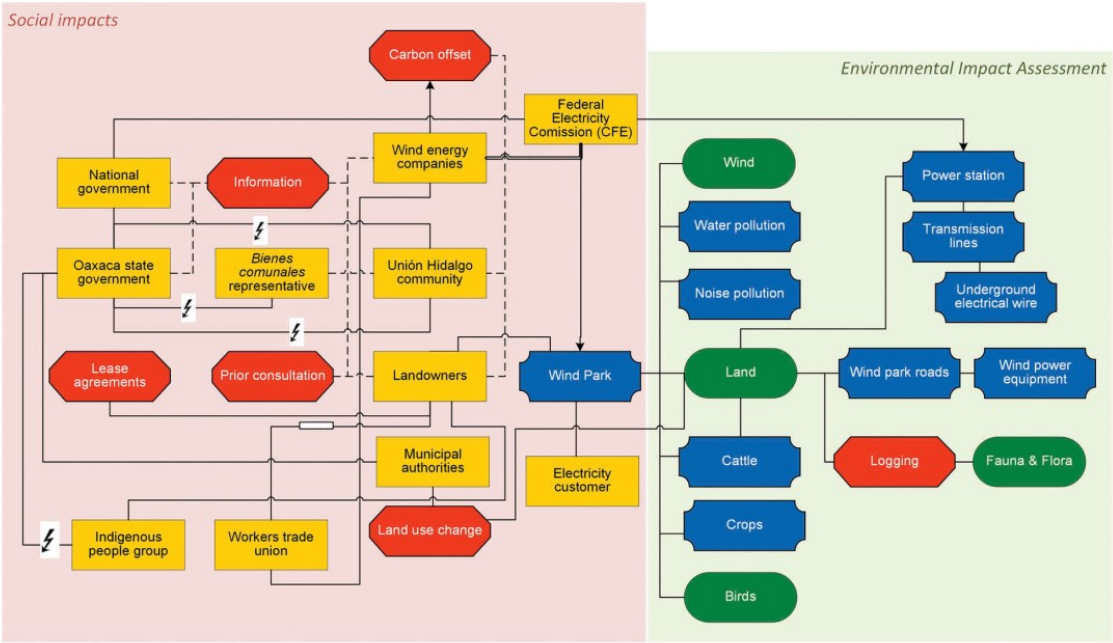

Figure 1. Constellation Analysis Diagram of a private wind park (March, 2014).

Case 2. Community wind parks potential and institutional barriers

This case study shows the institutional barriers as well as the challenges and opportunities for community wind parks in Mexico (Figure2). Ixtepec is a municipality in the Isthmus of Tehuantepec, with community land. According to the participants, since 2009, some members of the *Ixtepec communal* (mainly with indigenous background) wanted to launch a *community wind park*, by gaining the approval of the community in a public meeting called *Asamblea comunal*. They have been financially and technically supported by a *Community Interest Company (CIC)*, called *Yansa,* and future *social investors*. From the very beginning, this project plan has struggled to realize the wind park. The participants considered the institutional barriers hindering the development of such projects. Decision-making and planning are made at the national level, *SENER* is the planner and the *CRE* is responsible for the permitting process through *auction bids* from *wind parks* candidates (the *wind power companies* mainly with *international financial banks*). According to *SENER* authorities, it is difficult to think about community schemes in Mexico because the municipalities have insufficient financial resources, and a subsidy at the national level was considered as 'being impossible' (Interview 18).

In fact, the first idea of a *community wind park* came up when some members of the *Ixtepec community* complained about a new *power station* and *transmission lines* on community land without prior notice. The complaints of participants turned into a *civil-rights trial* against the *CFE* (Thomas 2015),

arguing that the electricity infrastructure was affecting the region's *agricultural and indigenous rights*, guaranteed by the *ILO Convention 169* Framework. They considered that the *Oaxaca state government* should support the community in coordination with the local *municipal authorities*, influenced by *local political actors,* making the conflict even more complex.

On the one hand, the participants identified some challenges for the *community wind park*. They found there is a competition between social enterprises like the CIC-Yansa, and the *wind energy companies,* with international finance. They also identified a challenge regarding the infrastructure; new *wind park roads* construction in agreement with the community, and suitable and national manufacturers of *wind power technology* for the region as well as technology *suppliers*.

On the other hand, the participants named numerous opportunities to foster public participation. The development of the community wind park project has been under several *consultation processes* with the whole community since the beginning. They have elected *group representatives* (e.g. women, senior residents, etc.) to collect opinions and to work on other alternative productive projects, supported by a planned *Fiduciary for the community* which aims to improve *human* development and reduce the current *unemployment* in the area. There was an opportunity to develop a benefit-sharing program, which would share profits with the community and not only with the landowners. Hence, the developers of the community wind park planned a *guarantee fund for future projects* to finance future wind parks in the area, with technical and business support to future *landowners*.

The participants considered *wind energy companies* in the area are not aware of the relationship between the indigenous communities with their *land* and *territory*. Therefore, their *indigenous customary law* could even direct local resources management (also Interview 10) (Guevara Romero et al. 2015). The Mexican Constitution (Art. 2) recognizes the country as a multicultural nation, where indigenous have rights to own procedures and organization, as well as use of the natural resources, excepting ones of national interests (DOF 2017b). They also assumed that by empowering their community through participative approaches, it would improve relations with the local *environment* and *biodiversity* as well as learning how to adapt the land use from agricultural to industrial. Other actors considered a significant potential to create community partnerships, as well as other approaches like small-scale wind energy in the region due to the great wind resource (Interview 5, 16).

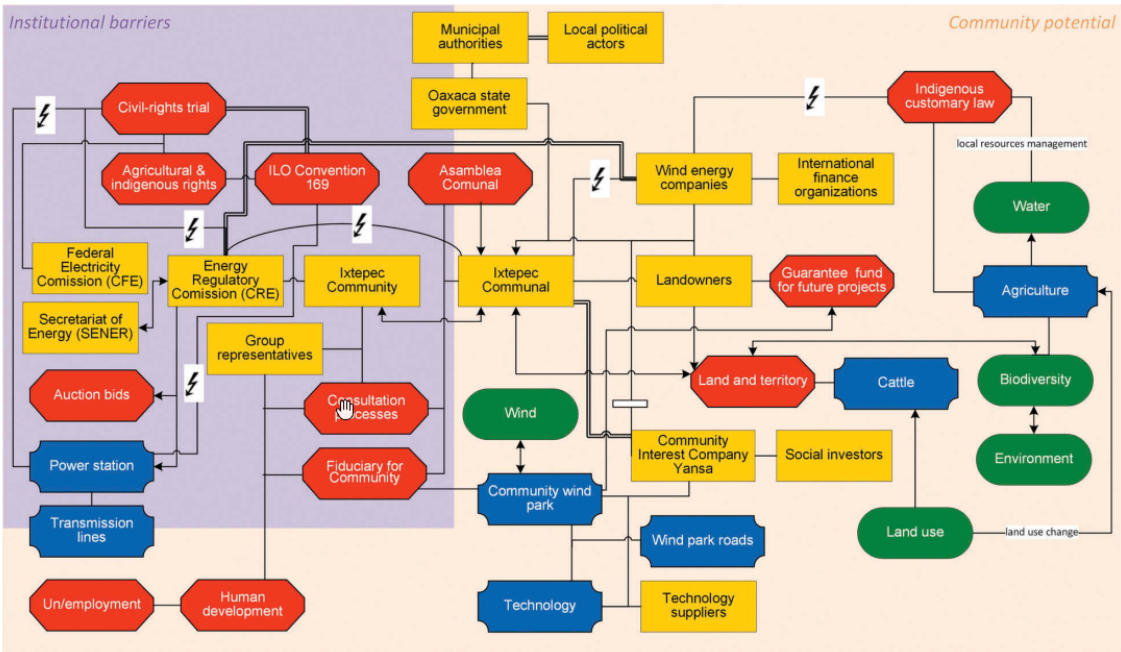

Figure 2. Constellation Analysis Diagram of a private wind park (February, 2014).

Other perspectives (from the indigenous opposition, academia, and wind energy company)

In this section, we present the main concerns raised in the CA workshops conducted for a) an organized group of indigenous peoples against wind park development, b) scientific-academic participants, and c) a private wind energy company with the interest of developing projects in the area.

The CA workshop with the opposition group (Figure 3 in Appendices) showed that the reason for indigenous opposition was created due to an inappropriate prior consultation with the *indigenous peoples*. The participants emphasized that *Prior consultation* within *indigenous peoples* should be an integral part of the Mexican *EIA*.

The participants considered the *government*, the *wind companies*, and the *EIA* process are not being aware of the difference between *land* and *territory*, its resources (*sea, rivers, water, fauna and flora, wind*), and their local economic activities (*fishing, crops,* and *cattle*). For them, the responsibilities of the multi-level governance system are not clear and who should be doing what, e.g. in terms of *information*, which is actually provided by *traditional media* and *local radio* to the communities. The opposition considered themselves as defenders of *indigenous and agrarian rights*, demanding the right to a *prior consultation* in terms of the *ILO Convention 169*. Thus, members of the opposition and other local members have *requested invalidity* of their undergoing *lease agreements* due to the lack of *information* and *proper consultation*. According to the participants, these opposition protests have faced a clear criminalization by

the local and regional government (Avila-Calero 2017), adding a conflictive relation between local opponents and the *wind energy companies.*

The CA workshop with members of the academia (Figure 4 in Appendices) pointed out the relevant *role of the international financing organization and their financing requirements*[1] within the *wind energy companies.* The participants mentioned *information and participation* shortages regarding wind energy development especially from the *national* and *state* government to the communities. This multi-level governance approach stands away from the local level and the *community*; where an *opposition* has grown between *landowners* and *residents without land* (mainly because of an unequal distribution of benefits), thus growing conflictive relations between municipal authorities and indigenous representatives (*Ejido* and *Comuna*). The participants mentioned a paradox regarding international policies making impacts at the local level, *international finance organizations* are promoting the wind development, but also an *opposition* at the local level, which is relying on international agreements, such as the *ILO Convention 169*.

The CA workshop developed with members of a wind energy company (Figure 5 in Appendices) (e.g. the *project planning* responsible), considered *local acceptance* as the major challenge for further *wind park* development in the region. Since there was no official national requirement for social effects assessment, *EIA* was focused on the environmental impacts. They mentioned as the main environmental impacts to take into account in the region, *noise, bird fatalities* (due to *bird migration corridors*), effects on the *local flora and fauna*, and *soil* and *groundwater protection*. Regarding social and cultural effects, they called for *indigenous communities'* participation and *lease agreements* to be considered within in EIA. The participants considered there are diverse stakeholders, political local actors (e.g. the *Transportation Trade Union*), and opposition groups (mainly *indigenous groups*), who have conflictive relations with the *wind energy companies*.

Discussion

We discuss our main findings related to the social issues and environmental assessment in the Isthmus of

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[1] The World Bank has updated their requirements on the *New Procurement Framework and Regulations for Projects* after July 1, 2016.

Tehuantepec, in Oaxaca, Mexico. There are participation weaknesses, especially concerning indigenous communities and their culture. However, there is an opportunity for community wind potential. We identified EIA challenges and improvement towards impact assessment practice in Mexico.

Participation weaknesses

The results showed shortcomings in practice regarding social issues as well as participation deficits in our case studies. Global institutions requirements and the national legal framework have shaped local participation. A top-down private wind park has not allowed proper local community participation mainly due to up-front planned projects. There is, however, a local initiative for a community wind park but it has been hindered by the limitations of the legal framework and promotion of community initiatives.

The findings on Case 1 are that community has primary concerns on the effects on the environment (birds, cattle, soil, underwater, noise) as well as on the community (land property and lease agreements) and its culture (indigenous people, social customs, and values). This is especially important with the increasing numbers of wind parks in the region and their cumulative impacts.

Local acceptance is seen as a major challenge for the wind energy company (as seen in our CA). Additionally, diverse conflicts and opposition to further wind development have risen in the region. Contrary to the results of a local social assessment research project (Nahmad-Sitton 2011), which argued the opposition comes only from non-owners, we found out many landowners who currently lease their land also disapproved of the wind parks management (Case 1, discussion group 1, and interview 8). The opposition from landowners is also based on the belief of unfairness within the lease agreement, concerning differences on conditions and payments. There is a high opposition to upcoming wind energy projects in the region, and the main argument is that the wind company and all levels of governments are missing their responsibility of giving information and providing an effective project consultation to civil society, especially when addressing indigenous communities and their culture.

As for who is responsible for ensuring public participation, the sole legal regulation for public participation was the EIA, whose responsibility falls under the national environmental authorities (SEMARNAT). Since the end of 2014, with the requirement of the energy sector, SENER is also tackling this process. The question remains on how these sectors are linked and how the communication between them can bring about more effective and meaningful participation in future projects.

Public participation has been an issue in the Mexican wind energy development, and the opposition group to wind energy has grown in Oaxaca. Gartman et al. (2014) suggested that involvement in decision-making and financial participation (in form of community-ownership, for example) could significantly improve public participation and acceptance.

Community wind potential

The essential findings on Case 2 are that challenges for the wind community are faced by lack of institutional opportunities and financial incentives. However, there is a clear opportunity for fostering not only a community wind park but also public participation at the local level. There is a significant interest of the stakeholders to not only to be passively consulted but also to be actively part of the development (e.g. by launching community wind parks or small-scale wind turbines). Therefore, the national planning system plays a relevant role in promoting future community projects, as well as to tackle other alternatives and the need of domestic wind technology.

The impact of community wind ownership could improve social acceptance. Some findings suggested 40-100% higher socioeconomic impact levels (job creation, incomes, etc.) in community funding partnerships, compared to those from privates' development (Beery and Day 2015; Larsen et al. 2015). Thus, improving social acceptance levels is essential for future project implementation. Participation is a democratic right of citizenship to influence political decision-making, and should not be seen as a way to decrease or remove opposition (Wright 2012).

EIA challenges and improvement ahead its practice

Mexico has faced for a while challenges concerning lack of open public information and poor diffusion of basic information, as well as in building environmental capacities (Weidner 2002). Our findings identified the relevant role of EIA in Mexico´s wind development:

The EIA statements from our case study 1 emphasized the economic aspects of the projects, however, the statements showed lack of detailed environmental information (concerning birds and other species) and monitoring (SEMARNAT 2008; SEMARNAT 2011). According to the *Strategic Environmental and Social Assessment for the wind development in the south of the Isthmus of Tehuantepec* (Idom 2015), this area is the most important bird corridor in America stretching from Canada to Central

America, yet there is no adequate management of impacts to this corridor due to lack of monitoring information.

Some interviewees (Interview 4 and 5) considered the authorities as responsible for the basic steps of environmental protection, as well as public participation at the project level. Thus, is very important (for SEMARNAT) to update environmental information, identify and clarify which information is reserved due to industrial property, and which must be openly public for the sake of environmental protection. Reinforcing the EA system through a variety of information access points is essential, as well as open sector communication to be followed to all levels.

The public participation within the EIA in our case was limited or non-existent. The EIA documents from case 1 do not document any stakeholder participation (SEMARNAT 2011), while the online CDM files Project Design Document (PDD) involved only some national authorities. This limited participation can be explained because the participation process within the EIA is through an online notice of intention and a further written request by the citizens, which restricts access in remote communities. Furthermore, some EIA data can be kept by the companies due to data protection and industrial property (Art.34) (DOF1996), which restricts providing valuable information via online (Odparlik and Köppel 2013).

Mexico's new SIA requirement for planned and future energy projects is a clear step forward regarding social impacts evaluation, and an integrated socio-environmental assessment ensures higher environmental standards (Dendena and Corsi 2015b). Adopting SIA as a separate assessment methodologically has been considered as a risk of superficial treatment (Glasson 2001).

It is important to state that the fieldwork in the area and the workshops were conducted before an SIA and an indigenous consultation was compulsory by law from the energy sector for every electricity and oil project in the country, and the panorama might have changed with the time. Besides the historical energy reforms, two strong earthquakes hit the Isthmus of Tehuantepec in September 2017, damaging the basic infrastructure and affecting also the social context. It would be interesting to know if the public´s perception has changed thereafter.

CA as a qualitative analytical approach

We presented CA as a novel approach to identify the status quo of the social and environmental issues within wind projects in the Isthmus of Tehuantepec, based on our particular cases. The workshop model,

as a participative form, allowed all participants to express their concerns and conceptualize the information in a simple and clear way. The performance of CA must be supplemented by other analytical approaches, in order to achieve deeper analysis. Case study research, semi-structured interviews, and literature and document review helped to support the information. We dare to say CA could be conducted in project planning processes, facilitating the developers to predict social concerns at an early stage of the project. In the EIA process, CA can be manageable performed, assisting in the Scoping step, e.g. with local communities' consultation, helping to identify the first key impacts on social and cultural aspects.

Conclusions

We analyzed the social conflicts related to the wind energy deployment in our case studies in the Isthmus of Tehuantepec in Oaxaca, Mexico. With this paper, we reiterate the relevance of socio-cultural issues of projects and their proper assessment. Based on our results and discussion, EIA did not consider socio-cultural implications, as well as a limited participation of the general public (even more limited indigenous participation). Addressing cumulative effects also in the social context seems to be a great challenge in a short and long-term.

The major challenge is seen in the evaluation of social implications in the EIA in Oaxaca. Despite that, EIA can clearly incorporate social issues in an integral evaluation (Larsen et al. 2015), but it needs to be dealt with in a far more depth than currently does. SIA could strongly assist a deeper evaluation of social impacts and human aspects, especially with indigenous communities, but not exclusively. Such a black or white decision is too difficult to state, it does not matter whether a SIA enhances an EIA (in a toolkit as in WB-financed projects), or within a single EIA (as it covers human aspects). EIA could better address human aspects, and in the case of our research project, also when concerning the socio-cultural aspects of indigenous communities. The Secretariat of Energy is issuing regulations concerning SIA and indigenous consultation, which highlight the importance of such evaluation. As (Vanclay and Esteves 2011) stated, SIA should be recognized as a tool to be adapted and improved by authorities, rather than just a social impact statement. We see it as a great improvement opportunity, it remains to be seen its evolution and whether there is a successful bridge between EIA and SIA.

Although there are institutional challenges for community wind parks, it is also seen as an opportunity to foster not only community ownership (and other schemes, like small-scale generation) but also public participation and acceptance at the local context.

We found essential aspects from global to local levels. While international organizations play a relevant role with their financing requirements, local organizations (e.g. indigenous communities) trust on international agreements (e.g. ILO Convention 169). There are challenges at the institutional setting on how to deal with top-down approaches such as CDM, but also with bottom-up initiatives like community wind parks. This example might contribute to building further analysis at the regional and national levels, as well as in another regions or countries with similar development patterns.

We presented CA as a qualitative novel approach to identify social and environmental issues in a participative form, applied on our cases at hand. CA could be conducted in project planning at an early stage, as well as in the EIA process in the scoping step. It can assist to identify and predict social and cultural concerns, e.g. when consulting local communities.

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Appendices

Table 1. Semi-structured interviews

	Place	Interviewee	Date
1	Juchitán, Oaxaca	CEO local wind energy company with international support	13.02.14
2	Juchitán, Oaxaca	Chief representative international wind energy company	13.02.14
3	Juchitán, Oaxaca	Social representative international wind energy company	14.02.14
4	Juchitán, Oaxaca	Energy municipality authority	14.02.14
5	Santo Domingo Ingenio, Oaxaca	Local representative	14.02.14
6	Juchitán, Oaxaca	Local university professor	14.02.14
7	Santo Domingo Ingenio, Oaxaca	Local farmer without leased land	15.02.14
8	Santo Domingo Ingenio, Oaxaca	Local farmer with leased land	15.02.14
9	Santo Domingo Ingenio, Oaxaca	Representative of local committee	15.02.14
10	Juchitán, Oaxaca	Representative national wind energy company	17.02.14
11	La Venta, Oaxaca	Representative local opposition group	19.02.14
12	Tehuantepec, Oaxaca	Three local university professors	21.012.14
13	Tehuantepec, Oaxaca	Local university professor	21.012.14
14	Ixtepec, Oaxaca	Three community wind project members	22.04.14
15	Oaxaca de Juárez, Oaxaca	Representative regional energy authority (Renewable Energy Department from Secretariat of Tourism)	28.02.14
16	Oaxaca de Juárez, Oaxaca	CEO local small-scale energy projects company	28.02.14
17	México, D.F.	Official from Climate change policies department from the environmental authority (SEMARNAT)	28.06.15
18	México, D.F.	Official from Sustainability department from the energy authority (SENER)	18.05.15
19	México, D.F.	Official from Social impact department from the energy authority (SENER)	20.05.15
20	México, D.F.	Researcher from Law Insitute.	20.05.15
21	Germany	Representative Latin-America department of a German development bank	11.04.16

Table 2. List of CA workshops

	Place	Approach from	Participants	Date
1	Unión Hidalgo, Oaxaca	Private wind park	Four landowners plus moderator	13.03.14
2	Ixtepec, Oaxaca	Community wind park	Three active community members plus moderator	23.02.14
3	Juchitán, Oaxaca	Opposition to wind parks	One representative plus moderator	12.03.14
4	Mexico City	Academic experts	Two social researchers from Oaxaca city and one university professor from Mexico City, plus moderator	14.03.14
5	Germany	Wind energy company	Two staff members plus moderator	16.05.13

Table 3. Focus group discussion

	Place	Meeting	Topic	Date
1	Unión Hidalgo, Oaxaca	Asamblea comunitaria	Private wind parks	19.02.14
2	San Dionisio del Mar, Oaxaca	Asamblea comunitaria	Private wind park (not yet constructed)	19.02.14
3	San Francisco del Mar, Oaxaca	Asamblea comunitaria	Private wind park (not yet constructed)	20.02.14
4	Ixtepec, Oaxaca	Informal meeting	Community wind park (planned)	21.02.14
5	Zapote, Oaxaca	Informal meeting	Community wind park (planned)	23.02.14

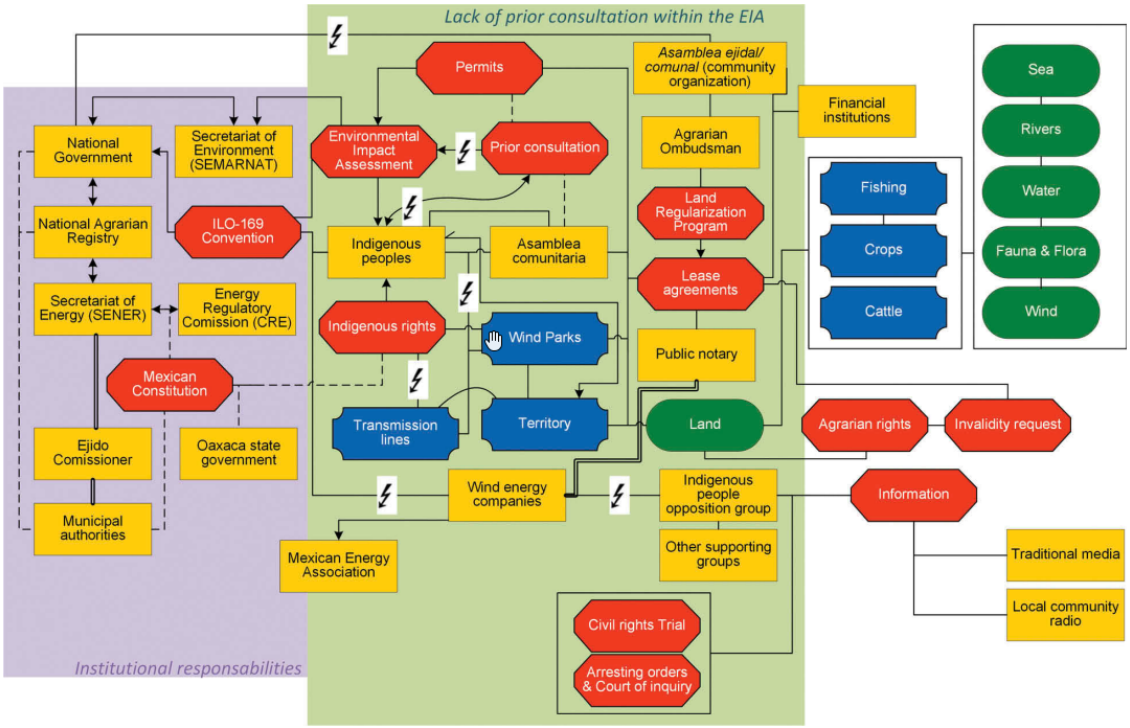

Figure 3. Constellation analysis diagram of indigenous peoples´ opposition

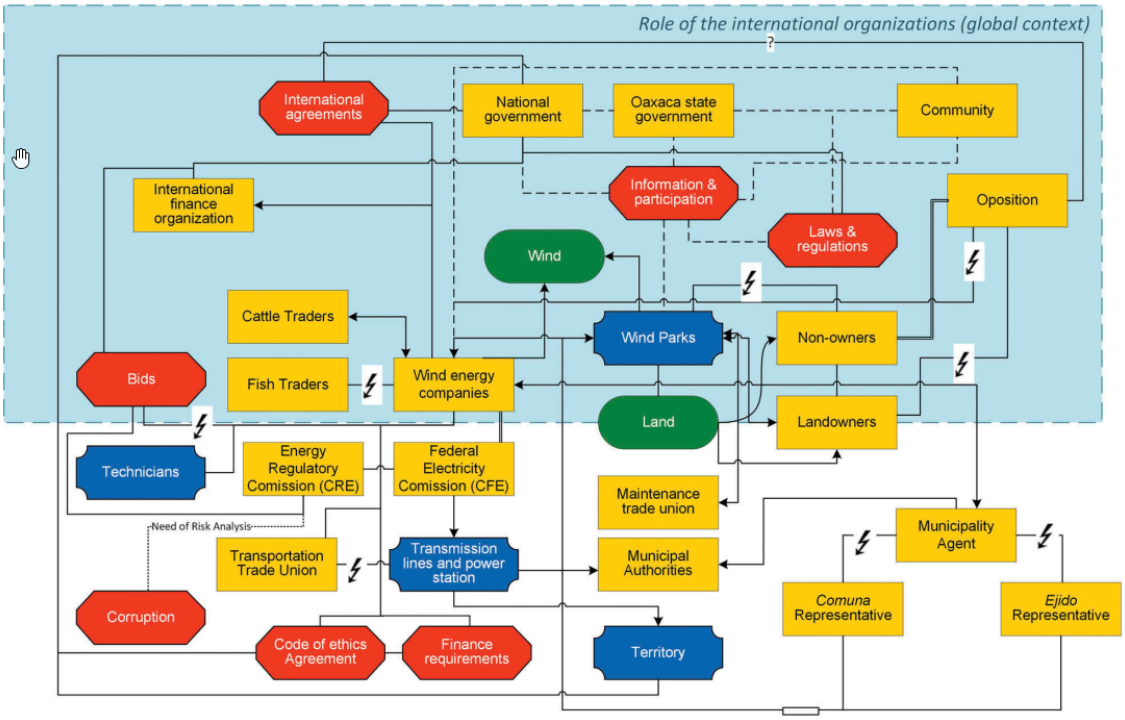

Figure 4. Constellation analysis diagram of academia

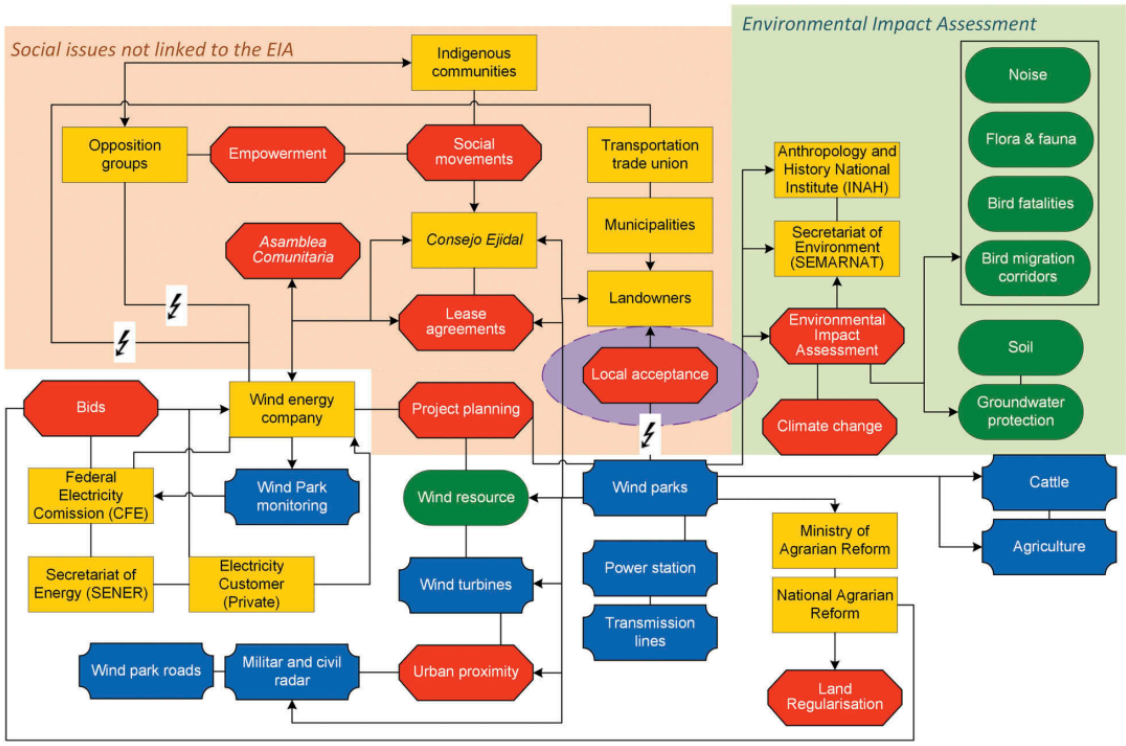

Figure 5. Constellation analysis diagram of wind energy company

Chapter V

Participación pública y consulta libre previa e informada en México: Caso campo Malva

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CAPÍTULO CUARTO

PARTICIPACIÓN PÚBLICA Y CONSULTA LIBRE PREVIA E INFORMADA EN MÉXICO: CASO CAMPO MALVA

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I. INTRODUCCIÓN

La evaluación del impacto ambiental (EIA) es un instrumento de política ambiental que busca prevenir y/o minimizar los impactos ambientales negativos de obras y/o actividades. En países emergentes conlleva retos en diferentes aspectos, entre otros, fallas en las capacidades institucionales en cuanto a la metodología y los criterios de evaluación. Una de las fallas más importantes se encuentra en la insuficiencia de mecanismos para el ejercicio de la participación pública, misma que, según el caso, debe incluir a las comunidades

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indígenas;[1] aunado a ello, se advierte cierta discrecionalidad en la determinación del proceso de consulta; así como, en la vinculatoriedad de los resultados de la consulta para la redefinición del proyecto de que se trate. Lo anterior da como resultado una escasa contribución pública significativa en el proceso de EIA; además, existe poca transparencia por parte de los proponentes y funcionarios del gobierno implicados.[2]

En términos generales, la participación pública es definida como la participación de grupos e individuos que serían afectados de manera positiva o negativa por alguna intervención propuesta, o aquellos que estén interesados en la misma.[3] A nivel internacional existen diversas disposiciones jurídicas que regulan la participación pública ambiental, la Convención de Espoo 1991 de EIA en contexto transfronterizo,[4] y la Convención de Aarhus 1998 respecto del acceso a la información, participación pública en la toma de decisiones y acceso a la justicia en materia ambiental[5] son ejemplo de ello.

El derecho a la participación forma parte de los denominados derechos de acceso: a la información, participación y justicia, que devienen del Principio 10 de la Declaración de Río de 1992 y hoy día se encuentran en el centro de la nueva hoja de ruta para el desarrollo sostenible, adoptada por Naciones Unidas en 2015, la Agenda 2030, que consta de 17 Objetivos de Desarrollo Sostenible (ODS).[6] De forma específica, el ODS 16 agrupa los tres derechos, pues éste mandata a los Estados a garantizar: i) el acceso público a la información y protección de las libertades fundamentales; ii) la adopción de decisiones inclusivas, participativas y representativas, y iii) la igualdad de acceso a la justicia. Asimismo, la agenda llama a

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[1] Arnold, L. y Hanna, K., *Best Practices in Environmental Assessment: Case Studies and Application to Mining*, Vancouver, Canadian International Resources and Development Institute, 2017, p. 10.

[2] Appiah-Opoku, S. y Hobson, C. B., "EA Follow-up in the Ghanaian Mining Sector: Challenges and Opportunities", *Environmental Impact Assessment Review*, vol. 41, July 2013, pp. 38-44, disponible en: *https://doi.org/10.1016/j.eiar.2013.02.003*.

[3] André, P. L. *et al.*, *Public Participation International: Best Practice Principles*, International Association Impact Assessment, 2006, p. 1.

[4] United Nations Economic Commission for Europe, *Convention on Environmental Impact Assessment in a Transboundary Context*, Geneva, UNECE, 2015, disponible en: *https://www.unece.org/index.php?id=40450&L=0*.

[5] Noble, B. F., *Introduction to Environmental Impact Assessment : A Guide to Principles and Practice*, 3a. ed., Reino Unido, Oxford University Press, 2015, p. 217; y United Nations Economic Commission for Europe, *Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters*, Geneva, UNECE, 1999, disponible en: *https://www.unece.org/env/pp/treatytext.html*.

[6] Organización de las Naciones Unidas, *Transformar nuestro mundo: la Agenda 2030 para el Desarrollo Sostenible*, Nueva York, ONU, 2015.

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crear instituciones eficaces, responsables y transparentes, y a adoptar leyes y políticas no discriminatorias a favor del desarrollo sostenible.[7]

En el ámbito latinoameriano, el 4 de marzo de 2018, fue adoptado el Acuerdo Regional sobre el Acceso a la Información, la Participación Pública y el Acceso a la Justicia en Asuntos Ambientales en América Latina y el Caribe, conocido como el acuerdo de Escazú, instrumento que significa un importante reconocimiento de los derechos humanos y la democracia ambiental en la región; además de ser el primer tratado ambiental vinculante en esta escala.[8]

En un contexto global, se reconoce que las comunidades indígenas podrían ser particularmente vulnerables a la pérdida, desposesión o explotación de sus territorios y acceso a sus recursos naturales y culturales frente a determinadas actividades o proyectos de desarrollo. Por lo que, en caso de posibles impactos negativos a causa de éstos a las comunidades indígenas, se requiere realizar la Consulta Libre, Previa e Informada (en adelante,CPLI) y, en determinados casos, obtener su consentimiento.[9] Este último es más fuerte que el derecho a ser consultado, pues implica la posibilidad de aprobar la realización de un proyecto o actividad.[10] Aunque la regulación internacional no se exige el consentimiento unánime, como elemento clave para la realización del proyecto.[11]

En algunos países latinoamericanos, la CPLI para proyectos extractivos tiene ya un largo recorrido, en Bolivia desde 2007 y en Perú desde 2012; pese a las limitantes que enfrenta, pues, por regla general, los proyectos de extracción son de "interés nacional", por lo que la consulta no es determinante para la realización de dichos proyectos.[12] En Brasil, las licencias ambientales conllevan un procedimiento de audiencias públicas y tratándose

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[7] Anglés Hernández, M., "El principio de acceso a la justicia ambiental", en Águila, Y. *et al*. (eds.), *Principios de Derecho Ambiental y Agenda 2030*, Valencia, Tirant lo Blanch, 2019, p. 223.

[8] Comisión Económica para América Latina y el Caribe, *Acuerdo Regional sobre el Acceso a la Información, la Participación Pública y el Acceso a la Justicia en Asuntos Ambientales en América Latina y el Caribe*, Chile, CEPAL, 2018.

[9] Parkins, J. R. y Mitchell, R. E., "Social impact assessment: A review of academic and practitioner perspectives and emerging approaches", en Hanna, K. S., (ed.), *Environmental Impact Assessment: Practice and Participation*, 3a. ed., Canada, Oxford University Press, 2016, pp. 122-140.

[10] Flemmer, R. y Schilling-Vacaflor, A., "Unfulfilled Promises of the Consultation Approach: The Limits to Effective Indigenous Participation in Bolivia's and Peru's Extractive Industries", *Third World Quarterly*, vol. 37, núm. 1, 2016, p. 172.

[11] Parkins, J. R. y Mitchell, R. E., "Social impact assessment...", *op. cit.*, p. 124.

[12] Flemmer, R. y Schilling-Vacaflor, A., "Unfulfilled...", *op. cit.*, p. 176.

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de comunidades indígenas, un proceso de consentimiento previo, libre e informado alineado al Convenio 169 sobre Pueblos Indígenas y Tribales en Países Independientes de la Organización Internacional del Trabajo (en adelante, Convenio 169), además del uso del conocimiento tradicional para medidas de mitigación.[13]

Al ser México parte del Convenio 169, tendría que apegarse a sus disposiciones, entre ellas, la del artículo 7.3 que establece la obligación de realizar los estudios, en cooperación con los pueblos interesados, para evaluar la incidencia social, espiritual y cultural y sobre el medio ambiente que las actividades de desarrollo previstas puedan tener sobre esos pueblos; cuyos resultados deberán ser considerados como criterios fundamentales para la ejecución de las actividades mencionadas.[14] Sin embargo, como veremos, ello no sucede.

En México, la EIA de competencia federal, esto es la dispuesta por la Ley General del Equilibrio Ecológico y la Protección al Ambiente (LGEEPA) en su artículo 28 y 5o. de su Reglamento en materia de Impacto Ambiental, presenta diferentes fallas estructurales en cuanto a la participación pública, el análisis de los aspectos sociales, así como a la falta de evaluación de impactos indirectos,[15] entre otras. Para efectos de este trabajo, sólo se tocará el tema de los procesos de participación pública de la EIA, la evaluación del impacto social (en adelante, EIS), y la CPLI —esta última aplicable a pueblos y comunidades indígenas, exclusivamente—.

De acuerdo con el Centro Mexicano de Derecho Ambiental (CEMDA), el proceso de la EIA tiene las siguientes limitaciones: 1) la consulta pública no cumple con los estándares internacionales en la materia; 2) no existe el derecho a la consulta, sino el derecho a solicitarla; 3) no hay un procedimiento especial para consulta a pueblos y comunidades indígenas; 4) carece de acceso efectivo a la información; 5) el medio masivo de difusión (Gaceta Ecológica) es de difícil acceso y consulta, y 6) no hay vinculación de las opiniones vertidas en los procesos participativos para la toma de decisiones.

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[13] Hanna, Philippe *et al.*, "Improving the Effectiveness of Impact Assessment Pertaining to Indigenous Peoples in the Brazilian Environmental Licensing Procedure", *Environmental Impact Assessment Review*, vol. 46, April 2014, pp. 58-67.

[14] OIT, *Convenio Núm. 169 de la OIT sobre pueblos indígenas y tribales en países independientes. Declaración de las Naciones Unidas sobre los Derechos de los Pueblos Indígenas*, Lima, OIT, Oficina Regional para América Latina y el Caribe, 2014, pp. 94 y 95.

[15] Centro Mexicano de Derecho Ambiental, *Modificaciones al Procedimiento de Evaluación de Impacto Ambiental*, México, CEMDA, 2014, disponible en: *http://www.cemda.org.mx/modificaciones-al-procedimiento-de-evaluacion-de-impacto-ambiental-eia/*.

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La consulta regulada en el procedimiento de EIA federal no se refiere al impacto social ni cultural de las obras o proyectos sujetos a evaluación, por lo que ignora la destrucción de un conjunto de valores humanos, culturales y sociales asociados a las prácticas comunitarias de uso de los recursos naturales y no debe confundirse o utilizarse como si se tratara del procedimiento de consulta tutelado en el marco del sistema internacional de los derechos humanos, pues su estructura y lógica de operación no tienen la misma finalidad.[16]

Por otro lado, a partir de 2014, como resultado de la reforma energética nacional, la Secretaría de Energía (SENER) exige como requisito obligatorio a los promoventes de proyectos de hidrocarburos y de generación eléctrica la presentación de una EIS, a partir de la cual, de existir la posibilidad de afectar a pueblos y comunidades indígenas, la propia SENER tendría que realizar la CPLI.[17] Recordemos que, de conformidad con el artículo 6o del Convenio 169, del que el Estado mexicano es parte, toda medida legislativa o administrativa susceptible de afectar directamente a estos colectivos debe ser sometida a consulta. Sin embargo, la Ley de Hidrocarburos (LH) señala que el uso, goce o afectación de los terrenos o bienes necesarios para la extracción o producción de hidrocarburos serán negociados por las partes interesadas, o bien, a través de un tribunal cuya decisión "debe privilegiar" el desarrollo de la industria de hidrocarburos.[18] Lo anterior implica que la consulta y, sobre todo, el consentimiento, pasan a segundo término, pues los proyectos de hidrocarburos son preferentes sobre cualquier otra actividad susceptible de realizarse en el terreno, lo que denota cierta imposición y, por tanto, colisión de derechos.[19]

Asimismo, no existe un vínculo entre la evaluación EIA y EIS, tampoco lo hay entre la consulta pública —aplicable a cualquier persona de la comu-

[16] Anglés Hernández, M. *et al.*, "Racionalidad legal, consulta ambiental y lucha de los pueblos indígenas por el desarrollo propio", en Gutiérrez Rivas, R. y Burgos Matamoros, M. (coords.), *Globalización, neoliberalismo y derechos de los pueblos indígenas en México*, México, UNAM, Instituto de Investigaciones Jurídicas, 2020, p. 226, disponible en: *https://archivos.juridicas.unam.mx/www/bjv/libros/12/5844/9.pdf*.

[17] *Reglamento de la Ley de Hidrocarburos*, México, *Diario Oficial de la Federación*, 31 de octubre de 2014, disponible en: *http://dof.gob.mx/nota_detalle.php?codigo=5366671&fecha=31/10/2014* y *Reglamento de la Ley de la Industria Eléctrica*, México, *Diario Oficial de la Federación*, 31 de octubre de 2014, disponible en: *http://dof.gob.mx/nota_detalle.php?codigo=5366665&fecha=31/10/2014*.

[18] *Reglamento de la Ley de Hidrocarburos...*, *op. cit*.

[19] Anglés Hernández, M., "Desarrollo energético vs. Sustentabilidad ambiental", en Carmona Lara, M. del C. A. y Acuña Hernández, A. L. (coords.), *La Constitución y los derechos ambientales*, México, UNAM, Instituto de Investigaciones Jurídicas-Conacyt, 2015, pp. 33-51, disponible en: *http://bibliohistorico.juridicas.unam.mx/libros/9/4089/6.pdf*.

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nidad aledaña al proyecto u obra— y la CPLI. Incluso, tales procedimientos se llevan a cabo por diferentes autoridades gubernamentales; la consulta pública es atribución de la Secretaría de Medio Ambiente y Recursos Naturales (en adelante, Semarnat) y la la CPLI, que corresponde a la regulada en el Convenio 169,[20] a la SENER, presentándose, incluso, un conflicto de interés para esta última, pues, por un lado es la responsable de impulsar el desarrollo energético y, al mismo tiempo, garantizar los derechos de los pueblos y comunidades indígenas en relación con los proyectos de energía. Aunado a ello, la EIS, también competencia de la SENER, carece de consulta al público general; lo cual ha provocado confusiones y desacuerdos.[21]

La Corte Interamericana de Derechos Humanos (Corte IDH) ha sostenido que la aprobación de proyectos capaces de afectar los recursos naturales y/o la supervivencia de pueblos indígenas, sólo podrá otorgarse luego de haber cumplido con tres garantías fundamentales: 1) participación efectiva (consultas de buena fe que permitan a los pueblos realmente exponer sus perspectivas e influir en la toma de decisiones); 2) reparto de beneficios, y 3) estudio previo de impacto ambiental y social.[22] Para el caso de México, la reglamentación vigente en materia de EIA centra las consultas en la determinación de medidas que se podrían adoptar para mitigar los efectos ambientales negativos; pero, como lo advierte el relator especial sobre los derechos de los pueblos indígenas, no contiene alcances generales que abarquen todas las cuestiones pertinentes para las comunidades afectadas por el proyecto.[23]

Bajo esta lógica, este artículo enfatiza el carácter fundamental de la participación pública en los procedimientos de EIA, EIS y CPLI; con base en un análisis de las fortalezas, oportunidades, debilidades y amenazas (FODA)

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[20] Anglés Hernández, M., "El derecho a la consulta libre, previa e informada no es la consulta regulada en el procedimiento de evaluación del impacto ambiental", *Idearios Jurídico-Ambientales*, tomo III, Impacto Ambiental, México, Secretaría de Medio Ambiente y Recursos Naturales-Gobierno del Estado de Quintana Roo, 2013, pp. 8-22, disponible en *http://biblioteca.semarnat.gob.mx/janium/Documentos/Ciga/Libros2011/229481.pdf*.

[21] Rousseau, I., "La nueva regulación de la gestión social de los proyectos energéticos en México. Seguridad, sustentabilidad y gobernabilidad", *Revista Mexicana de Ciencias Políticas y Sociales*, vol. 62, núm. 230, 2017, p. 213.

[22] Organización de los Estados Americanos, *Derechos de los Pueblos Indígenas y Tribales sobre sus Tierras Ancestrales y Recursos Naturales: Normas y Jurisprudencia del Sistema Interamericano de Derechos Humanos*, OEA, Washington, D. C., 2009, p. 93.

[23] MacKay, F., *Compilación de Jurisprudencia de los órganos de los tratados de la ONU y de las recomendaciones del Consejo de Derechos Humanos y sus procedimientos especiales y de la asesoría del mecanismo de expertos sobre los derechos de los pueblos indígenas*, United Kingdom, Forest Peoples Programme, 2013, pp. 154 y 155.

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del caso de estudio del campo Malva; el cual abre una discusión sobre las oportunidades identificadas en el análisis. Finalmente, se hacen algunas recomendaciones que pudieran extenderse a otros casos para fortalecer el actual desempeño de las consultas (pública e indígena) y la participación pública, tanto en la EIA como en la EIS; específicamente, se alude a un modelo de proceso iterativo de la EIA/EIS con la pertinencia de integrar la consulta pública y la CPLI en la EIS; señalando los objetivos de incluir la participación pública en cada una de las fases de la EIA y la EIS.

II. Metodología: análisis FODA y caso de estudio

El análisis FODA se ha usado originalmente en el ámbito empresarial e institucional; aunque también se ha aplicado en otros campos, incluida la planeación ambiental y la EIA.[24] En el análisis FODA, las fortalezas y debilidades son los factores internos de un sistema, mientras que las oportunidades y amenazas son factores externos. Para este análisis: 1) se tomó como único caso de estudio el proyecto de desarrollo de actividades de hidrocarburos relativo al Campo Malva, ubicado en Chiapas; 2) se realizó la revisión sistemática de literatura con publicaciones relevantes al caso de estudio y a los temas sobre la participación pública en las EIA, EIS y CPLI, y 3) se identificó el marco legal aplicable a la participación pública en México en los procesos de la EIA, EIS y CPLI.

La justificación para analizar un único caso de estudio se basa en las condiciones determinadas porque:[25] a) representa una contribución significativa en el estudio de la participación pública en la EIA, EIS y CPLI; b) muestra la limitación de acceso a la información; además, es un caso excepcional porque detonó su exclusión del proceso de licitación derivado del rechazo de las comunidades indígenas; c) permite analizar la participación pública en un proyecto extractivo en el marco de la reforma energética, y d) constituye un indicador de lo que pasa o podría pasar en otros proyectos similares en el contexto actual mexicano.

[24] Jha-Thakur, U. y Fischer, T. B., "25 Years of the UK EIA System: Strengths, Weaknesses, Opportunities and Threats", *Environmental Impact Assessment Review*, vol. 61, November, 2016, pp. 19-26; Paliwal, R., "EIA Practice in India and Its Evaluation Using SWOT Analysis", *Environmental Impact Assessment Review*, vol. 26, núm. 5, 2006, pp. 492-510; Glasson, J., "The First 10 Years of the UK EIA System: Strengths, Weaknesses, Opportunities and Threats", *Planning Practice & Research*, vol. 14, núm. 3, 1999, pp. 363-375.

[25] Yin, R. K., *Case Study Research : Design and Methods*, 5a. ed., Thousand Oaks, Sage 2014, p. 47.

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III. Marco legal de la participación pública en las evaluaciones del impacto ambiental y del impacto social en México

En México, la EIA es el instrumento legal avalado por la LGEEPA, así como por su Reglamento en materia de Evaluación del Impacto Ambiental (RLGEEPAEIA). En ambos instrumentos se regula la consulta pública y la reunión pública de información, pero no la CPLI, ni la EIS. Asimismo, la LGEEPA incorpora la consulta pública en los Programas de Ordenamiento Territorial, y en los anteproyectos de Normas Oficiales Mexicanas (NOM).[26] A su vez, la Corte IDH sostuvo que la realización de estudios de impacto ambiental se enmarca en las obligaciones mínimas de los Estados para prevenir violaciones a derechos humanos a causa de daños ambientales.[27]

En términos estrictos, la consulta pública en la EIA puede ser solicitada por cualquier persona de la comunidad de que se trate, dentro de los primeros diez días de la publicación del proyecto en la Gaceta Ecológica, sin embargo, corresponde a la autoridad decidir si ésta se realiza,[28] evidenciándose la discrecionalidad de la autoridad. No obstante, a la luz del interés público, relacionado con el medio ambiente, y del principio pro persona, podría exigirse a la autoridad que lleve a cabo el procedimiento de consulta pública, como elemento fundamental del derecho a un medio ambiente sano.

A su vez, la LGEEPA refiere que procede una reunión pública de información a los 25 días de iniciada la consulta pública, cuando el proyecto pueda ocasionar desequilibrios ecológicos graves o daños a la salud pública o los ecosistemas,[29] por lo que también se incluye la participación de autoridades gubernamentales, instituciones académicas, y organizaciones sociales y empresariales. Ambos procesos de participación pública son gestionados por la Semarnat. Cabe señalar que la LGEEPA data de 1996, y hasta la fecha no ha tenido modificaciones con respecto a la participación pública; por lo que debe interpretarse a la luz de todos los cambios constitucionales que protegen derechos humanos.

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[26] *Ibidem*, artículos 20 bis y 20 bis 5, fracción VII. Véase Anglés Hernández, M., "La participación pública para la sostenibilidad en México", *Revista Internacional de Direito Ambiental*, Brasil, año II, núm. 6, septiembre-diciembre de 2013, p. 221.

[27] Corte Interamericana de Derechos Humanos, Opinión Consultiva OC-23/17 Medio ambiente y derechos humanos, del 15 de noviembre de 2017, párrs. 144 y 145.

[28] Artículo 34, fracción I, Ley General del Equilibrio Ecológico y la Protección al Ambiente, México, *Diario Oficial de la Federación*, 28 de enero de 1988. Reformas del 13 de diciembre de 1996.

[29] Artículo 34, fracción III, Ley General del Equilibrio..., *op. cit.*

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Es fundamental señalar que, la participación de las comunidades indígenas no está incluida legalmente en el proceso de la EIA. Sin embargo, la LGEEPA sí considera su participación en otros instrumentos de política ambiental, como el decreto y programa de áreas naturales protegidas, los programas de restauración ecológica, programas de biodiversidad, así como en el sistema de planeación ambiental.[30] Como resultado de la reforma energética, la SENER estableció como requisito obligatorio, previo a la realización de los proyectos energéticos, la elaboración de una "consulta previa, libre e informada a los pueblos indígenas" para proyectos de hidrocarburos,[31] y de generación eléctrica.[32] No obstante, la relatora especial sobre los derechos de los pueblos indígenas advirtió la prevalencia de la brecha existente "entre la realidad jurídica, política e institucional y los compromisos internacionales asumidos por el Estado mexicano".[33]

Para mejorar los procesos de participación en la EIA y la EIS es fundamental garantizar el acceso a la información; en este sentido, son relevantes las disposiciones de la Ley Federal de Transparencia y Acceso a la Información Pública (LFTAI),[34] que obligan a la Semarnat y a la SENER a dar acceso a la información concerniente a los proyectos autorizados, a través de evaluaciones ambientales; así como la relativa a los procedimientos de CPLI; no obstante ni la Ley de Hidrocarburos ni la Ley de la Industria Eléctrica hacen referencia a ello, aunque sí lo hace la LGEEPA, mediante los procedimientos de evaluación de impacto ambiental.[35] Asimismo, la Ley General de Transparencia y Acceso a la Información Pública (LGTAI) determina las obligaciones de transparencia comunes a los documentos de impacto ambiental (véase figura 1).[36]

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30 Artículos 58 y 78, Ley General del Equilibrio..., *op. cit.*

31 Artículos 85 a 87, *Reglamento de la Ley de Hidrocarburos..., op. cit.*

32 Artículos 89 a 92, *Reglamento de la Ley de la Industria Eléctrica..., op. cit.*

33 Naciones Unidas, *Informe de la Relatora Especial sobre los derechos de los pueblos indígenas sobre su visita a México*, Ginebra, Consejo de Derechos Humanos, 28 de junio de 2018, p. 17.

34 Artículos 69, fracción VII, inciso l y 73, fracción IV, inciso d, respectivamente, *Ley Federal de Transparencia y Acceso a la Información Pública*, México, *Diario Oficial de la Federación*, 9 de mayo de 2016. Reformas del 27 de enero de 2017.

35 Reglamento de la Ley de Hidrocarburos..., *op. cit.*

36 Artículo 70, fracción XXVIII, incisos a y b, apartado 8, en ambos incisos. *Ley General de Transparencia y Acceso a la Información Pública*, México, *Diario Oficial de la Federación*, 4 de mayo de 2015.

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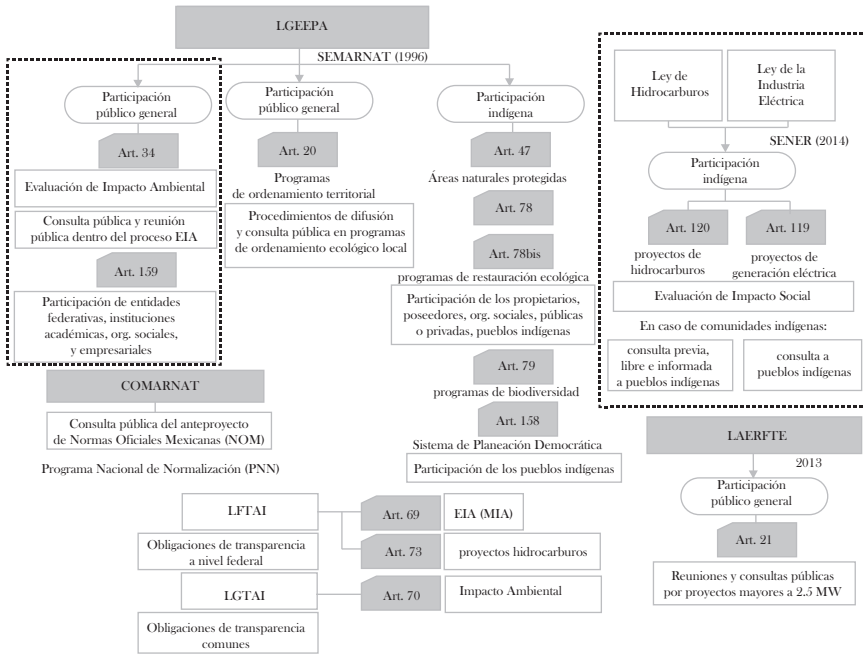
FIGURA 1
MARCO LEGAL DE LA PARTICIPACIÓN PÚBLICA EN LA EIA Y OTROS INSTRUMENTOS DE POLÍTICA AMBIENTAL Y TRANSPARENCIA EN MÉXICO



FUENTE: elaboración propia a partir de la normatividad referida.[37]

En este sentido, es relevante la jurisprudencia de la Corte IDH que ha analizado desde una perspectiva integradora la necesidad de realizar estudios previos de impacto social y ambiental, a cargo de entidades independientes y técnicamente capaces, bajo la supervisión del Estado, en relación con todo plan de desarrollo, inversión, exploración o extracción que pretenda desarrollarse dentro de un territorio indígena.[38] Así lo reiteró el Comité de Derechos Económicos, Sociales y Culturales al gobierno de México, con

[37] Secretaría de Energía, *Consulta Previa sobre las Actividades de Exploración y Extracción de Hidrocarburos en las áreas contractuales 10 y 11 de la Ronda 2.2*, México, SENER, 2017, diponible en: *https://www.gob.mx/sener/acciones-y-programas/consulta-previa-sobre-las-actividades-de-exploracion-y-extraccion-de-hidrocarburos-en-las-areas-contractuales-10-y-11-de-la-ronda-2-2*.

[38] Corte Interamericana de Derechos Humanos, *Caso del Pueblo Saramaka vs. Surinam (Excepciones Preliminares, Fondo, Reparaciones y Costas)*. Sentencia del 28 de noviembre de 2007, párr. 129 y Corte Interamericana de Derechos Humanos, *Caso Pueblos Kaliña y Lokono vs. Surinam. Fondo, Reparaciones y Costas*. Sentencia del 25 de noviembre de 2015, párr. 201.

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adicionándole la obligación de velar porque "los acuerdos suscritos para llevar a cabo tales proyectos prevean medidas de mitigación de su impacto en los derechos económicos, sociales y culturales, así como indemnizaciones suficientes para los pueblos indígenas afectados".[39]

IV. Caso de estudio: industria de exploración y extracción de hidrocarburos, Campo Malva, Chiapas

La selección de este caso de estudio se determinó por la disponibilidad de información sobre el proyecto, ya que los documentos sobre EIA, EIS y CPLI están oficialmente publicados, lo que no sucede respecto de otros casos. Además, es especialmente interesante porque después de haber iniciado la CPLI, la SENER determinó excluir de las bases de licitación esta área contractual debido al rechazo de las comunidades indígenas.

El campo Malva se ubica dentro del área contractual 11, en el llamado *Bloque de Chiapas*, que forma parte de varios de los campos licitados por la empresa petrolera canadiense *Renaissance Oil Corp, S. A., de C. V.,* en México.[40] Fue la primera empresa extranjera en producir petróleo en México luego de la reforma energética de 2013. Además, se ha convertido en la segunda productora de petróleo en el país, después de la empresa petrolera nacional Petróleos Mexicanos (PEMEX).[41] En mayo de 2016, *Renaissance Oil Corp, S. A., de C. V.,* firmó contratos por 25 años para la extracción de petróleo crudo y gas natural de algunos campos ya existentes, entre ellos campo Malva (antes operados por PEMEX).[42]

Históricamente, en el estado de Chiapas existe un fuerte legado de movimientos indígenas y protesta social, que alcanzaron la visibilidad a través del Movimiento Zapatista de Liberación Nacional (EZLN), por lo que no sorprende que, en junio de 2017, alrededor de seis mil miembros de comunidades indígenas zoques protestaran en rechazo a la extracción de hidrocarburos en la entidad; a pocas horas de que el proceso de CPLI de la

[39] Naciones Unidas, *Observaciones finales sobre a los informes periódicos quinto y sexto combinados de México,* E/C.12/MEX/CO/5-6, Nueva York, Consejo Económico y Social, 17 de abril de 2018, p. 3.

[40] Renaissance Oil Corp, S. A. de C. V., *Renaissance Is Developing a High Quality, Diversified Shale and Mature Fields Portfolio for Development in Mexico,* Renaissance Oil Corp Operations, 2018, diponible en: *http://renaissanceoil.com/operations/*.

[41] Oil & Gas Magazine, "*Renaissance Oil*. La primera petrolera extranjera en producir en México", 20 de junio de 2016, p. 1, disponible en: *https://oilandgasmagazine.com.mx/renaissance-oil-la-primera-petrolera-extranjera-en-producir-en-mexico/*.

[42] *Idem.*

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SENER fuera extendido.[43] Como resultado de las inconsistencias en el procedimiento de CPLI, las comunidades indígenas se opusieron al proyecto y la SENER tuvo que determinar, en 2017, excluir esta área del proceso de licitación; no obstante, el mismo es susceptible de retomarse.[44] Respecto a los documentos oficiales sobre EIA, EIS y CPLI existen diversos puntos de reflexión, mismos que abordamos enseguida.

1. *Evaluación del impacto ambiental*

Como resultado de la reforma energética de 2013, se crea en el 2015 la Agencia Nacional de Seguridad Industrial y Protección del Medio Ambiente del Sector Hidrocarburos (ASEA), como un órgano administrativo desconcentrado de la Semarnat, facultada para regular de manera exclusiva las actividades del sector hidrocarburos, desde la exploración hasta la venta al consumidor final, en los aspectos de seguridad industrial y protección del medio ambiente. A pesar de diversas expresiones de rechazo, el 11 de agosto de 2014 se publicó en el *Diario Oficial de la Federación* (*DOF*) la Ley de la Agencia, en la que se le faculta, entre otras, para emitir autorizaciones en materia de impacto y riesgo ambiental del sector hidrocarburos.[45]

De manera que la Manifestación de Impacto Ambiental (MIA) relativa al campo Malva fue evaluada por la recién creada ASEA. Según información contenida en la MIA, el campo Malva se ubica en la zona más prolífica de aceite y gas del país, la llamada cuenca petrolera del sureste. El documento señala que no hay un impacto ambiental adverso significativo a causa de las actividades petroleras, por lo que no se presentarán afectaciones irreversibles al ecosistema.[46] Entre los impactos ambientales considerables identificados por la MIA se encuentra la generación de gases de efecto

[43] Gómez, M., "Zoques: ¿tramitar consulta o respetar el territorio?", *La Jornada*, México, 27 de junio de 2017, disponible en: *https://www.jornada.com.mx/2017/06/27/opinion/014a1pol*.

[44] El Financiero, "Indígenas ganan primer round a la SENER por ronda 2.2", México, 21 de junio de 2017, disponible en: *https://www.elfinanciero.com.mx/economia/sener-pide-excluir-dos-bloques-en-chiapas-de-la-ronda-por-consulta* y Secretaría de Energía, *Plan Quinquenal de Licitaciones para la Exploración y Extracción de Hidrocarburos 2015-2019*, México, SENER, 2019, p. 15.

[45] Ley de la Agencia Nacional de Seguridad Industrial y de Protección al Medio Ambiente del Sector Hidrocarburos, México, *Diario Oficial de la Federación*, 11 de agosto de 2014.

[46] Renaissance Oil Corp, S. A., de C. V., *Manifiesto de impacto ambiental regional (MIA-R) para las áreas contractuales 11 (Campo Malva), 15 (Campo Mundo Nuevo) y 25 (Campo Topén)*, México, 2017, p. 10, disponible en: *https://rondasmexico.gob.mx/media/4412/1-mia-cnh-r01-l03-a11-2015-malva-reinassance-v2.pdf*.

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invernadero (GEI) y afectaciones a la calidad del paisaje. Además, posibles impactos acumulativos por el proceso de deforestación y pérdida de recursos hídricos de la región. Por lo que el documento propone algunas medidas de mitigación y un programa de vigilancia ambiental.[47]

En cuanto a la participación pública en el proceso de la EIA de campo Malva, es importante señalar que no se documentó la realización de ningún mecanismo de consulta pública o reunión pública en el que los posibles afectados pudieran expresarse.

2. *Evaluación del impacto social*

La EIS permite identificar e implementar acciones para coadyuvar a la sostenibilidad del proyecto y al respeto de los derechos humanos durante la vigencia de las actividades del proyecto.[48] De conformidad con el artículo 121 de la LH, los interesados en obtener un permiso o una autorización para desarrollar proyectos en esta materia —asignatarios y contratistas— tienen que presentar a la SENER una EIS que deberá contener la identificación, caracterización, predicción y valoración de los impactos sociales que podrían derivarse de sus actividades, así como las medidas de mitigación y los planes de gestión social correspondientes.[49]

Aunque a la EIS le recae una resolución que puede incluir recomendaciones hechas por parte de la SENER, aquélla no implica una autorización del proyecto. No obstante, la resolución deberá presentarse por el promovente para efectos de la autorización del impacto ambiental. Cuando de la revisión de la EIS, la SENER determina que en el área se encuentran pueblos y comunidades indígenas susceptibles de verse afectados por el proyecto, la SENER debe proceder a realizar la CPLI, a través de la Dirección General de Impacto Social y Ocupación Superficial, la que notificará al promovente sobre la procedencia de este procedimiento previsto en el artículo 120 de la LH.[50]

Por lo que hace a la EIS del proyecto campo Malva, es importante señalar que no contempló en ninguna de sus fases una participación pública significativa. En su lugar, se hicieron doce entrevistas semiestructuradas a actores relevantes al proyecto; así como, cuestionarios para recoger datos

[47] *Ibidem*.
[48] Secretaría de Energía, *Consulta Previa sobre las Actividades...*, *op. cit.*
[49] *Reglamento de la Ley de Hidrocarburos...*, *op. cit.*
[50] *Idem*.

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demográficos y de percepción en sólo una de las localidades de la zona del proyecto. De esta manera se identificaron dos impactos sociales positivos (insumos para viviendas, pagos por ocupación de tierra) y seis negativos (afectación de caminos, segregación de pobladores por delimitación de terrenos, falta de vinculación entre PEMEX y la comunidad, falta de empleo local, contaminación y disminución de cultivos tradicionales). Cabe señalar que del análisis demográfico geográfico de la zona, se identificó la presencia de población indígena en cuatro localidades ubicadas dentro del área de influencia del Proyecto: Santa Cruz 3ra. sección, Sunuapa, Santa Cruz 2da. sección y Pichucalco; concretamente, los municipios Pichucalco y Sunuapa están catalogados con "Población Indígena Dispersa"; no obstante, debido a que la población indígena no es representativa en el 90% de localidades del área contractual del campo Malva, el promovente consideró que no era necesaria la CPLI;[51] aunque, esta determinación no le corresponde al promovente, sino a la Dirección General Adjunta de Evaluación de Impacto Social y Consulta Previa de la SENER, la cual, una vez corroborada la información proporcionada por el promovente, a través del Catálogo de Localidades Indígenas CDI, 2010, reiteró la no procedencia de la consulta indígena,[52] sin embargo, recomendó considerar una efectiva participación de los actores locales identificados para realizar la implementación de las acciones y estrategias propuestas dentro del Plan de Gestión Social.

Fue así que, mediante la reunión de trabajo sostenida entre representantes de la Dirección General Adjunta de Evaluación de Impacto Social y Consulta Previa de la SENER, la Secretaría General de Gobierno del Estado de Chiapas y los presidentes muncipales de Francisco León, Tecpatán, Pichuchalco e Ixtacomitán del estado de Chiapas se acordó realizar la consulta a las comunidades indígenas ubicadas en las áreas contractuales de la Ronda 2.2, en razón de ello se realizó la relativa al Campo Malva.[53]

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[51] Universidad Autónoma Metropolitana, *Evaluación de Impacto Social Área Contractual 11 Campo Malva*, México, 2017, disponible en: *https://rondasmexico.gob.mx/media/4417/evis-r01l03-malva.pdf*. Renaissance Oil Corp, S. A., de C. V., *Manifiesto de Impacto Ambiental Regional...*, *op. cit.*

[52] Secretaría de Energía, *Dictamen técnico: evaluación de impacto social área contractual 11 Campo Malva*, México, SENER, Dirección General Adjunta de Evaluación de Impacto Social y Consulta Previa, 2017, disponible en: *https://gtpdf.info/document/8cb055b/dictamen-t%C3%A9cnico-transparencia*.

[53] Secretaría de Energía, *Minuta de la reunión de trabajo entre la Dirección General Adjunta de Evaluación de Impacto Social y Consulta Previa de la SENER, la Secretaría General de Gobierno del Estado de Chiapas y los presidentes municipales de Francisco León, Tecpatán, Pichuchalco e Ixtacomitán del Estado de Chiapas*, Tuxtla Gutiérrez, Chiapas, SENER, 19 de agosto de 2016, disponible en:

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3. *Consulta previa, libre e informada a comunidades y pueblos indígenas*

El marco jurídico vinculante del derecho de los pueblos y comunidades indígenas a la CPLI se encuentra en el artículo 6o del Convenio 169, que se refuerza con el contenido del artículo 15 del mismo instrumento; de ambos preceptos se desprende la obligación del Estado mexicano de consultar a los pueblos y comunidades indígenas previo a otorgar concesiones, permisos o cualquier otro acto sobre bienes que se hallen en territorios indígenas, esto a fin de dar a conocer a los integrantes de los pueblos y comunidades indígenas los riesgos e implicaciones de tales acciones; así como las medidas para reducir o mitigar las posibles afectaciones y, en caso de no ser posible, proceder a la indemnización. En este proceso se debe garantizar, en la medida de lo posible, la participación de estos colectivos en los beneficios derivados de la medida o proyecto planteado.[54]

Es importante identificar la relación del derecho a la consulta con el relativo a la participación pública. En el caso del pueblo indígena Kichwa de Sarayaku vs Ecuador respecto de una empresa petrolera que realiza actividades en territorio ancentral, la Comisión Interamericana de Derechos Humanos consideró que el derecho a la CPLI debe garantizar la participación efectiva y significativa en la toma de decisiones sobre el desarrollo y acciones que afecten a los pueblos indígenas.[55] En México, la Suprema Corte de Justicia de la Nación refrendó la obligación de todas las autoridades del Estado de consultar a comunidades y pueblos indígenas, en el ámbito de sus atribuciones, antes de adoptar cualquier acción o medida susceptible de afectar sus derechos e intereses.[56] Posteriormente, en cuanto a la realización anómala de los procedimientos de CPLI, la Comisión Nacional de Derechos Humanos elaboró la Recomendación 27/2016 enfatizándose que, la CPLI "se activa con la premisa de llegar a un acuerdo que vincule a las partes para su cumplimiento. Las autoridades no pueden sustraerse unilateralmen-

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https://www.gob.mx/cms/uploads/attachment/file/199684/1__Minuta_de_trabajo_-_Tuxtla_Gutierrez_-_19_de_Agosto_de_2016.pdf.

[54] Anglés Hernández, M. y Basurto Gálvez, Patricia, "Derecho a la consulta y al consentimiento libre, previo e informado. Algunas experiencias en México", en Argueta Villamar, A. *et al.* (eds.), *Protección, desarrollo e innovación de conocimientos y recursos tradicionales*, México-Conacyt, 2018, pp. 110 y 111.

[55] Comisión Interamericana de Derechos Humanos, *Demanda ante la Corte Interamericana de Derechos Humanos en el caso del Pueblo Indígena Kichwa de Sarayaku y sus miembros contra Ecuador*, Washington, D. C., CIDH, 2010, punto 6.

[56] Tesis: 1a. CCXXXVI/2013, *Semanario Judicial de la Federación y su Gaceta,* México, Décima Época, primera sala, libro XXIII, tomo 1, 8 de agosto de 2013.

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te de los acuerdos pactados como resultado del proceso de consulta". Por lo que los proyectos que demandan la realización de la CPLI sólo pueden ser viables como resultado del consentimiento en el proceso de consulta.[57]

En cuanto al campo Malva, fueron consultadas por la SENER las comunidades indígenas zoques y tzotziles de los municipios de Pichucalco, Ixtacomitán, Tecpatán y Francisco de León, en el estado de Chiapas. Para ese momento, que se carecía normas sobre la consulta, la SENER definió que el proceso debía incluir las fases siguientes: Plan de consulta, acuerdos previos, fase informativa, deliberativa, consultiva y de seguimiento de acuerdos.[58] Sin embargo, solo se documentaron las reuniones realizadas en algunas de las localidades de Ixtacomitán y no hay acceso a la información sobre la fase consultiva y de seguimiento de acuerdos. A continuación, una breve descripción de cada una de las fases y su realización, en caso de haber información:

— Fase de plan de consulta. Se trata de la planeación que lleva a cabo la SENER para la realización de la CPLI y el establecimiento de mecanismos de coordinación con las dependencias y entidades involucradas. En este caso, la planeación se realizó con representantes del gobierno federal (SENER, Secretaría de Gobernación, Secretaría de Desarrollo Agrario, Territorial y Urbano, Comisión Nacional para el Desarrollo de los Pueblos Indígenas, Comisión Nacional de Hidrocarburos (CNH) y ASEA; así como de gobiernos regionales del estado de Chiapas y municipales (Pichucalco, Ixtacomitán, Tecpatán, y Francisco de León) y, en algunos casos, representantes ejidales (Ixtacomitán), sin embargo, no se documentó presencia de representantes de las comunidades indígenas. Las autoridades presentaron los beneficios asociados a la industria de exploración y extracción de hidrocarburos y consideraron los posibles impactos a los recursos hídricos locales; mientras que, las autoridades municipales y ejidales aprovecharon para solicitar al gobierno del estado de Chiapas las gestiones necesarias para la pavimentación y reparación de caminos y puentes, mejoramiento de infraestructura de salud y educación. Es decir, la reunión fue vista por los represen-

[57] Comisión Nacional de los Derechos Humanos, *Recomendación General No. 27/2016 sobre el derecho a la consulta previa de los pueblos y comunidades indígenas de la República Mexicana*, México, CNDH, 2016, párr. 160.

[58] Secretaría de Energía, *Consulta previa a comunidades y pueblos indígenas*, México, SENER, 2018, disponible en: *https://www.gob.mx/cms/uploads/attachment/file/273192/consultaLibre2.pdf* y Secretaría de Energía, *Consulta previa sobre las actividades...*, *op. cit.*

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tantes locales como una oportunidad de participación para solicitar aquello que consideraron hacía falta en la zona, desvirtuándose los fines de esta fase.[59]

— Fase de acuerdos previos. Consiste en las deficiones que la SENER y las autoridades tradicionales o representativas de las comunidades y pueblos indígenas convienen sobre la forma en la que se llevará a cabo la CPLI. En el caso del campo Malva intervinieron los representantes municipal y ejidal, llamados "representantes tradicionales", en lugar de acreditar la representación de la comunidad indígena. El documento precisa que, a través de los representates tradicionales, "la comunidad indígena aprueba el protocolo de consulta y determina que bajo este instrumento se deberá desarrollar el procedimiento de consulta"; sin embargo éste fue firmado por un único representante de la comunidad ejidal, quien no es representante de la comunidad indígena. En otra reunión en el mismo municipio de Ixtacomitán, se documenta la presencia de sesenta miembros de la comunidad zoque, quienes fueron únicamente espectadores.
— Protocolo de consulta. Por virtud de éste se explican las fases de la consulta, detalles generales del proyecto, actividades de exploración y extracción de hidrocarburos y posibles impactos ambientales y sociales. Llama la atención que en este caso se proporcionó a las comunidades mucha información sobre los beneficios del proyecto y muy poca sobre los impactos negativos asociados al mismo. El protocolo final fue elaborado por actores oficiales en conjunto con representantes locales (ejidales y municipales, pero no indígenas); lo que de origen vicia y nulifica el objetivo de este proceso al dejarles fuera.
— Fase informativa. Alude a la entrega de información suficiente y culturalmente pertinente a las comunidades y pueblos indígenas sobre el proyecto que se somete a CPLI. Por tanto, es una oportunidad para que las comunidades indígenas soliciten más información sobre los impactos que consideran relevantes. En el campo Malva refirieron afectaciones directas a la tierra (deslaves); así como implicaciones de la ocupación temporal de las tierras.
— Fase deliberativa. Es el periodo de diálogo que ocurre al interior de la comunidad o pueblo indígena para la toma de decisiones sobre la aceptación del proyecto sometido a CPLI. Como resultado de este proceso se realizaron tres asambleas consultivas, de las cuales solo

[59] Secretaría de Energía, *Consulta previa sobre las actividades...*, *op. cit.*

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se documentaron los resultados de la comunidad La Candelaria, Ixtacomitán, en la que se dio un "consentimiento condicionado" a: 1) no realizar actividades de fracturación hidráulica *fracking*; 2) no realizar actividades en asentamientos urbanos y respetar 500 m de distancia de ellas, como área de amortiguamiento; 3) que las actividades no impliquen desplazamiento y/o reubicación de la comunidad en cuestión; 4) cualquier actividad extra proyectada deberá ser acordada en Asamblea Comunitaria; 5) el contratista deberá financiar la pavimentación de los caminos especificados; 6) el promovente debe asegurar la participación de la comunidad indígena en la EIA y la EIS, así como en el plan de trabajo; 7) el promovente debe desarrollar un programa de empleo local y de capacitación; 8) se acuerda un grupo de seguimiento integrado por la SENER y la comunidad indígena (Acta de Asamblea Comunitaria). Por último, se estipuló que la firma de los documentos oficiales no conlleva un acuerdo o consentimiento por ninguna de las partes.

— Fase consultiva. Es para la construcción de acuerdos o la obtención del consentimiento libre e informado, según sea el caso, sobre el desarrollo del proyecto sometido a CPLI. Lamentablemente, no se cuenta con la documentación de esta fase para el proyecto en estudio.
— Fase de Seguimiento de Acuerdos. Su objetivo es el monitoreo del cumplimiento de los acuerdos adoptados, utilizando el mecanismo que para tal efecto defina la comunidad o pueblo indígena consultado. Esta fase no se alcanzó, pues luego de la disminución paulatina de reuniones y participantes en las fases del proceso de CPLI. Después de casi dos meses de reuniones y desacuerdos con las comunidades, al llegar a esta fase, la CNH informó que el área contractual del campo Malva no se incluiría en el proceso de licitaciones, ya que el proceso de CPLI se había extendido y no era compatible con los tiempos de la licitación.[60]

V. Análisis FODA de la participación pública en las evaluaciones de impacto ambiental, social y la consulta libre previa e informada

Aunque los procesos de EIA, EIS y CPLI representan un gran potencial para la participación pública, diversas fuentes han señalado las debilidades de és-

[60] Secretaría de Energía, *Plan Quinquenal de...*, *op. cit.*, p. 15.

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tas en México.[61] El Grupo de Trabajo de Naciones Unidas sobre Derechos Humanos y Empresas subrayó que la debida diligencia en materia de derechos humanos no solo requiere la garantía de la CPLI, para la que rigen normas concretas de derechos humanos, sino que se consulte también a todas las demás comunidades afectadas.[62] Este criterio es retomado por la Organización para la Cooperación y el Desarrollo Económico, destacándose la acción de las empresas extractivas para evitar y hacer frente a las consecuencias negativas en los derechos humanos.[63]

Es por ello, que realizamos un análisis FODA sobre tales vías de participación en los tres procesos referidos, aplicado al caso campo Malva (véase tabla 1); así como, del marco legal relativo a la participación pública en dichos procesos (véase síntesis en tabla 2).

Tabla 1
MATRIZ DE ANÁLISIS FODA RESPECTO DE LAS VÍAS PARTICIPATIVAS EN LOS PROCEDIMIENTOS DE EIA, EIS Y CPLI

	(+) Fortalezas	*(-) Debilidades*
Factores internos	— Regulación del procedimiento de consulta pública en la EIA. — Regulación de la consulta y el consentimiento libre, previo e informado en el Convenio 169 del que el Estado mexicano es parte.	— Diferencias en los procedimientos de EIA de proyectos ambientales de competencia federal y del sector hidrocarburos; los cuales están a cargo de autoridades diversas, en el primer caso, corresponde a la Semarnat y en el segundo a la ASEA.

[61] Centro Mexicano de Derecho Ambiental, Modificaciones al Procedimiento..., *op. cit;* Gartman, Victoria *et al.*, "Wind of Change or Wind of Challenges: Implementation Factors Regarding Wind Energy Development, an International Perspective", *AIMS Energy*, vol. 2, núm. 4, 2014, pp. 485-504; Huesca-Pérez, M. E., Sheinbaum-Pardo, C. y Köppel, J., "Social Implications of Siting Wind Energy in a Disadvantaged Region – The Case of the Isthmus of Tehuantepec, Mexico", Renewable and Sustainable Energy Reviews, vol. 58, May, 2016, pp. 952-965; Palerm, J. y Aceves, C., "Environmental Impact Assessment in Mexico: An Analysis from a «Consolidating Democracy» Perspective", *Impact Assessment and Project Appraisal*, vol. 22, núm. 2, June, 2004, pp. 99-108.

[62] Organización de las Naciones Unidas, *Informe del Grupo de Trabajo sobre la cuestión de los derechos humanos y las empresas transnacionales y otras empresas acerca de su misión a México*, Ginebra, Consejo de Derechos Humanos, 2017, p. 10.

[63] Organización para la Cooperación y el Desarrollo Económicos, *Guía de OCDE de Diligencia Debida para la Participación Significativa de las Partes Interesadas en el Sector Extractivo*, París, OCDE, 2016, *in extenso*.

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	(+) Fortalezas	*(-) Debilidades*
Factores internos	— Reconocimiento de la SENER de la importancia de los aspectos sociales de los proyectos, así como de la CPLI. — Integración de la EIS y la CPLI en el marco jurídico del sector hidrocarburos. — La CPLI resultó ser el único mecanismo de participación pública en el proyecto.	— Discrecionalidad administrativa sobre la decisión de realizar la consulta pública en materia ambiental. — Obsolescencia de la LGEEPA y su reglamento en cuanto a los procesos participativos en la EIA, lo que muestra un desfase en torno a la garantía de los derechos humanos. — El resultado de la EIS no determina la viabilidad del proyecto. — Conflicto de interés en las autoridades implicadas en los procesos participativos (fungen como "juez y parte"). La SENER en la EIS y la ASEA en la EIA. — Diseño vertical (impositivo) y *ad hoc* de la CPLI. — Desviación de los fines de la CPLI para solicitar al gobierno infraestructura local (que debe solventar por otras vías). — La EIA y CPLI se utiliza para legitimar procesos participativos sin fuerza vinculante. — En la EIS, se deja en manos de quien realiza el estudio la identificación de las comunidades indígenas para determinar la procedencia o no de la CPLI.

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	(+) Fortalezas	*(-) Debilidades*
Factores externos	— Existen impactos sociales positivos de los proyectos que pueden potenciarse y generar sinergias, en este caso, la creación de empleos y la capacitación. — Contribución de la EIS para gestionar conflictos. — Asambleas comunitarias como vías para el ejercicio democrático de la participación pública. — Necesidad de actualizar el proceso de participación pública en la EIA al marco jurídico sobre derechos humanos. — Aportaciones del conocimiento tradicional en las medidas de mitigación y compensación de la EIA y en el Plan de Gestión Social de la EIS. — Integración de la CPLI y de la consulta y pública (EIA) a la EIS.	— Los impactos sociales cubren un espectro muy difícil de evaluar (autonomía, libre determinación, desarrollo, territorio, tenencia de la tierra, etc.). — La CPLI presenta muchas variables muy complejas de resolver. — La CPLI podría ser utilizada como un mecanismo para viabilizar los proyectos, a cambio de pequeños apoyos a las comunidades indígenas; desvirtuándose su objeto.

FUENTE: elaboración propia.

VI. Discusión y recomendaciones

El análisis de la participación pública de la EIA, EIS y CPLI, así como del orden jurídico mexicano con respecto a nuestro caso de estudio, identifica las siguientes fortalezas (F), oportunidades (O), debilidades (D), y amenazas (A).

En referencia a la participación pública en el marco jurídico se determinan varias limitaciones. Por un lado, la participación en el proceso de EIA no es obligatoria por ley (D), por lo que debería considerarse una reforma que sea vinculante para la autoridad ambiental (O); la CPLI no forma parte de la consulta pública en materia ambiental, que además, la autoridad ambiental puede realizar discrecionalmente (D). Por otro lado, la integración de la CPLI y de la EIS en el marco legal mexicano reconoce la importancia de los aspectos sociales de los proyectos de hidrocarburos y de generación eléctrica, así como de consultar a las comunidades indígenas (F). Existe la obligación del Estado mexicano de garantizar el ejercicio de la CPLI, como parte de la ratificación del Convenio 169 (F).

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La CPLI resulta un aspecto muy complejo de gestionar y con muchas variables conceptuales (A). Las reuniones de las distintas fases de la consulta del caso de estudio fueron una oportunidad para las comunidades indígenas para expresarse, y solicitar a los gobiernos regional y locales trabajos de infraestructura (D), los cuales deben realizarse en otro contexto; esto podría ser utilizado como un mecanismo para viabilizar el proyecto a cambio de pequeños apoyos, perpetuando la pauperización de las comunidades indígenas (A). Paradójicamente, la CPLI resultó ser el único mecanismo de participación pública en el proyecto (F). No obstante, la consulta tiene un diseño vertical, *ad hoc*, que restringe la verdadera participación de comunidades indígenas, éstas son consultadas en la última fase con un protocolo ya delineado anteriormente por las autoridades (D); perpetuándose así, el sometimiento y simulando una decisión democrática.

Con respecto a la EIS, a pesar de que podría contribuir sustancialmente a la gestión de conflictos (O), ésta se realiza de manera muy generalizada, carece de una participación pública significativa, por lo que se corre el riesgo de ser únicamente un trámite burocrático, en vez de un proceso de evaluación (D). En materia de hidrocarburos se creó una agencia especial —la ASEA— para dictaminar los impactos ambientales, situación que no era necesaria, pues existía ya la Semarnat como cabeza de sector ambiental para la determinación de tales impactos (D). Se hace envidente el conflicto de interés de las autoridades implicadas en los procesos participativos, ya que fungen como "juez y parte". La SENER en la EIS y la ASEA en la EIA (D). En la EIS, se deja en manos de quien realiza el estudio la identificación de las comunidades indígenas para determinar la procedencia o no de la CPLI (D). Por último, el resultado de la EIS no es determinante para que la SENER viabilice o frene la aprobación de un proyecto (D); por tanto, no es vinculante.

Los impactos sociales cubren un amplio espectro de evaluación muy difícil de abordar, en el caso de estudio, por ejemplo, la tenencia de la tierra, autonomía y gestión social (A). Existen impactos sociales positivos del proyecto, identificados por las comunidades, como la creación local de empleos y capacitación (O). Sin embargo, muchos de los impactos sociales son negativos y la EIS podría tener un efecto beneficioso en una situación de conflicto cuando está respaldada por un alto grado de participación pública, ya que es más probable tener una negociación y soluciones efectivas cuando hay mayor involucramiento del público.[64]

[64] Prenzel, P. V. y Vanclay, F., "How Social Impact Assessment Can Contribute to Conflict Management", *Environmental Impact Assessment Review*, vol. 45, 2014, pp. 33 y 34.

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Finalmente, se identificaron algunas oportunidades considerables para enriquecer la práctica de la EIA y EIS en nuestro caso de estudio. Las asambleas comunitarias son un notable ejemplo del ejercicio democrático de participación pública (O). Tradicionalmente, las asambleas comunitarias son la base de las decisiones colectivas en las comunidades indígenas, repartición de trabajo e, incluso, de cargos al interior de ellas.[65] Sería valioso considerar posibles contribuciones del conocimiento tradicional a las líneas base, tanto ambientales (EIA), como sociales (EIS), (O). Las comunidades indígenas se identifican y tienen un fuerte vínculo con su cultura tangible (sitios arqueológicos, recursos naturales) e intangible (lengua, música, tradiciones) y ésta debería ser considerada y protegida en la planeación de un proyecto.[66] Por lo que la integración de las percepciones de la comunidad y de su conocimiento tradicional podría enriquecer las medidas de mitigación y compensación.[67] De manera particular, destacamos la pertinencia de integrar la consulta pública y la CPLI en el proceso de la EIS (O); bajo la siguiente argumentación:

> Es absolutamente necesario fomentar la participación pública en el proceso de EIA, por lo que, la consulta pública (y la reunión pública de información) deberían ser vinculantes. Es ineludibe la obligación del Estado mexicano en cuanto a la garantía del derecho a la participación indígena en los proyectos de desarrollo susceptibles de afectarles, ello como resultado de la ratificación del Convenio 169[68] y del reconocimiento de la autonomía y libre determinación de los pueblos indígenas, a través de las reformas del año 2001 al artículo 2o. de la Constitución mexicana.[69] De manera que, la EIS podría enriquecerse al incluir la CPLI (y consulta pública) dentro de su proceso de realización. Esta integración de procesos facilitaría el desarrollo del proyecto mismo.

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[65] Gallardo García, E., "Lo público en los procesos comunitarios de los pueblos indígenas en México", *Polis*, núm. 31, 2012, p. 8.

[66] Smyth, E. y Vanclay, F., "The Social Framework for Projects: A Conceptual but Practical Model to Assist in Assessing, Planning and Managing the Social Impacts of Projects", *Impact Assessment and Project Appraisal*, vol. 35, núm. 1, 2017, pp. 74-76.

[67] Nzeadibe, T. Ch. *et al.*, "Integrating Community Perceptions and Cultural Diversity in Social Impact Assessment in Nigeria", *Environmental Impact Assessment Review*, vol. 55, 2015, p. 82; Glasson, J., "The Importance of Cultural Aspects in Impact Assessment and Project Development: Reflections from a Case Study of a Hydroelectric Dam in Brazil", *Impact Assessment and Project Appraisal*, vol. 34, núm. 4, 2016, p. 307.

[68] International Labour Organization, *Indigenous and Tribal Peoples' Rights in Practice: A Guide to ILO Convention No. 169*, Geneva, ILO, 2019, pp. 59-77.

[69] Navarrete Linares, F., *Los pueblos indígenas de México*, México, Comisión Nacional para el Desarrollo de los Pueblos Indígenas, 2008, p. 134.

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En junio de 2018, posterior a nuestro caso de estudio, se publicó el Acuerdo para las Disposiciones Administrativas de Carácter General sobre la Evaluación de Impacto Social en el Sector Energético, que enfatizan que la EIS deberá realizarse con un enfoque participativo amplio. Se pide contemplar el punto de vista de las comunidades en la identificación, caracterización, predicción y valoración de los posibles impactos sociales, así como en las medidas para mitigarlos, prevenirlos y ampliarlos. Además de mecanismos de participación activa en el plan de gestión social.[70] Queda pendiente saber a corto y largo plazo el desempeño de estas disposiciones en futuras EIS.

Dado que las fases del proceso de evaluación de impactos ambientales y sociales son muy similares metodológicamente,[71] presentamos el proceso legal de la EIS, competencia de la SENER, con la propuesta de incorporación de participación pública (consulta pública y CPLI), (véase figura 2). Este modelo de proceso iterativo señala los requerimientos por parte de la SENER e indica las fases propuestas integrando tanto la consulta pública como la CPLI en el proceso, específicamente al inicio del proceso, en la fase de Alcances (identificación de impactos probables) y en la fase de plan de gestión social (tal como lo indican las nuevas disposiciones legales para EIS).

[70] Secretaría de Energía, Acuerdo por el que se emiten las Disposiciones Administrativas de Carácter General sobre la Evaluación de Impacto Social en el Sector Energético, México, *Diario Oficial de la Federación*, 1o. de junio de 2018.

[71] IFC, *A Guide to Biodiversity for the Private Sector*, Washington, D. C., International Finance Corporation, 2012, disponible en: *https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/publications/biodiversityguide*; Noble, Bram F., *Introduction to Environmental…*, *op. cit.*, p. 17.

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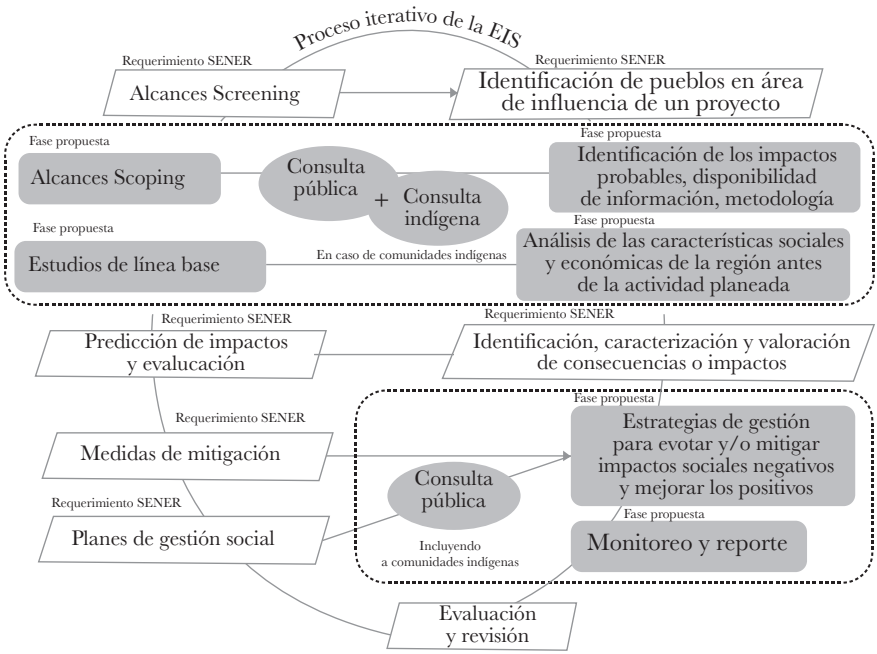
FIGURA 2
PROCESO DE LA EIS ACTUAL CON FASES PROPUESTAS



FUENTE: elaboración propia con adaptación de *International Finance Corporation, a Guide to Biodiversity for the Private Sector*, Washington, D. C., IFC, 2012.

Un punto importante de reflexión es que la integración de la CPLI en el proceso de la EIS no debería verse como algo complejo. Gestionado de manera organizada y apropiada a las circunstancias, en un proceso próximo a la EIS y no aislado como hasta ahora, consideramos que existe gran potencial para la optimización de ambos procesos, y podría contribuir a la materialización de la garantía de los derechos humanos y del buen gobierno.

La participación pública es considerada como elemento clave en la EIA y EIS. Dada la naturaleza y alcances de los proyectos que se someten a EIA, el proceso debiese implicar la participación pública en casi todas sus fases; desde los alcances (*Screening*) hasta su implementación y seguimiento.[72] La participación pública ha sido reconocida como factor esencial en la práctica de la EIA, actualmente es obligatoria en la mayoría de los sistemas de

[72] Noble, B. F., *Introduction to Environmental…*, *op. cit.*, p. 217.

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autorizaciones ambientales a nivel mundial.[73] Asimismo, la participación pública debe ser parte integral de la EIS y debería iniciarse desde las fases tempranas de la misma.[74] Una buena práctica de la EIS implica un proceso participativo y de entendimiento de las comunidades locales, lo que facilita el proceso de acuerdos y asegura, sobre todo, la participación de comunidades vulnerables,[75] incluidas las indígenas. La tabla 2 resume los propósitos de la participación pública en cada una de las fases de la EIA, aplicables a la EIS.

TABLA 2
OBJETIVOS DE LA PARTICIPACIÓN PÚBLICA EN EL PROCESO DE EIA. OBJETIVOS DE LA PARTICIPACIÓN PÚBLICA EN LAS DIFERENTES FASES DE LA EIA Y EIS

Diseño inicial del proyecto	— Identificación temprana de intereses y valores con respecto a la ubicación del proyecto.
Alcances (Screening)	— Notificación temprana a las partes interesadas.
Alcances (Scoping)	— Identificación del público (activo e inactivo). — Contribución del conocimiento local para los estudios de línea base. — Identificación de posibles impactos significativos. — Identificación de alternativas. — Establecer contacto y confianza entre proponente y público.
Predicción y evaluación de impactos	— Obtención de valores y conocimientos para asistir la predicción de impactos. — Identificación de criterios para evaluar impactos.
Reporte y revisión	— Información al público de los detalles del proyecto, condiciones, impactos y medidas de gestión. — Obtención de retroalimentación del público e identificación de errores u omisiones.

[73] *Idem*.

[74] Barrow, C. J., *Social Impact Assessment: An Introduction*, London, Arnold, 2000, p. 54.

[75] Esteves, A. M., Franks, D. y Vanclay, F., "Social Impact Assessment: The State of the Art", *Impact Assessment and Project Appraisal*, vol. 30, núm. 1, 2012, pp. 34-42.

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Toma de decisiones	— Planteamiento de resolución a posibles conflictos. — Integración de condiciones (medidas de mitigación y compensación) y aprobaciones al documento.
Seguimiento	— Mantener confianza y credibilidad. — Identificación de la efectividad de la gestión. — Monitoreo de cambios ambientales.

FUENTE: elaboración propia.

VII. CONCLUSIONES

El caso del campo Malva estudiado hizo evidente la falta de participación pública significativa, tanto en la EIA como en la EIS e, incluso en la CPLI. La reglamentación de la EIA contempla una consulta pública sin un procedimiento especial en caso de afectaciones del proyecto a comunidades indígenas. La reglamentación de la EIS, como tal, no había contemplado una participación pública significativa o contribución ciudadana a su proceso, hasta junio 2018 con la publicación de las Disposiciones administrativas sobre la realización de la EIS. Sin embargo, en caso de se identifiquen comunidades indígenas, se limita a recomendar una CPLI. Queda saber el resultado de estas nuevas disposiciones en las próximas EIS.

Identificamos algunas oportunidades para mejora del proceso de EIA y EIS en un proceso significativamente participativo. Las asambleas ejidales representan un modelo de ejercicio democrático y participación pública en México. Igualmente, el conocimiento tradicional de las comunidades podría generar importantes aportaciones tanto para la EIA como para la EIS; desde la identificación de impactos hasta la selección de medidas de mitigación y compensación.

Los procedimientos de la SENER en torno a la reaalización de una EIS y, en su caso, CPLI carecen de un enfoque de participación significativa en general y, en especial, de las comunidades indígenas. Aunque es interesante señalar que la CPLI resultó ser el único mecanismo de participación pública en nuestro caso de estudio. El hecho de tener procedimientos aislados para la participación pública, además de carecer de fuerza vinculante, hace aún mas complicada la participación pública. Se necesita un claro compromiso institucional para, pasar de un mero requerimiento legal, al ejercicio de la participación pública.

El actual desempeño de la EIA y EIS se podría mejorar de manera relevante, si se lleva a cabo un proceso metodológicamente adecuado que

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incluya la participación del público interesado -incluidas las comunidades indígenas-, no solo para legitimar procesos institucionales, sino para involucrar a las personas en la definición y/o redefinición del desarrollo mismo del proyecto o actividad de que se trate. Es por ello, que recomendamos un modelo de proceso iterativo de la EIA y EIS con la pertinencia de integrar la consulta pública y la CPLI en la EIS, además de aclarar los objetivos de incluir la participación pública en cada una de las fases tanto de la EIA como de la EIS.

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Chapter VI

Conclusions and final outcomes

This dissertation is the resulting cumulative work of the review and research papers published during my PhD process. The main focus is on the wind energy planning in Mexico, its impact assessment with spotlight on the social implications and public participation of siting wind parks specifically in rural, indigenous regions. It is clear that many of the social conflicts derived from the top down planning approach of the wind energy as well as from participation shortcomings. This chapter gives conclusions and set a further discussion regarding the assessment of social issues. The major findings from this doctoral research are explained in the next subsections: 1.1) a general categorization of social implications of wind energy; 1.2) identification of the strengths and opportunities regarding public participation and indigenous consultations in the environmental Mexican framework; 1.3) the use of Constellation Analysis (CA) as a participative approach to analyze socio-environmental issues within the Environmental Impact Assessment and Social Environmental Assessment.

As a final outcome, there are substantial social impacts of wind energy when planning in disadvantaged regions, often triggered from public participation weaknesses. In some cases, when the social issues addressed in the EIA are not sufficient enough (i.e. when the guidelines are focused on human aspects like demographic and geographic information); the use of SIA may help to a deeper evaluation of particular social impacts, especially when indigenous communities are implicated. Nevertheless, such a strict statement is difficult to state, since EIA could better address also socio-cultural aspects at the local level and perform a meaningful public participation for everyone, involving indigenous communities as well. Therefore, both environmental assessments need to be improved mainly in offering effective and meaningful public participation mechanisms for all actors.

1.1.Social impacts of wind energy and its assessment

Social impact is understood through the adaptation of a social system to external changes, which includes the social and cultural consequences modifying the way of life and the human relationships within a community (Barrow, 2000). Since the social context is not the main aim of the EIA, there is a growing concern and general uncertainty regarding the incorporation of social issues within this evaluation (Esteves et al., 2012; Larsen et al., 2015). While EIA has a stablished legal framework in most countries, SIA is not yet so commonly legislated. SIA has evolved in the last decades, and its relevance has been even more notable in emerging countries, due to an increasing infrastructure investment, as well as with social conflicts at the local level (Vanclay et al., 2015). At the global context, multilateral financial institutions have applied SIA methods, and the World Bank (WB) is one of the main precursor concerning social effects analysis and guidelines of early consultations for indigenous peoples in EIA processes for infrastructure projects (Roberts 2006; Dendena and Corsi 2015).

The case of Mexico is a good example on how top down planning and a vertical decision-making approach, ironically based on international climate policies, has created significant social impacts at the regional and local setting. Most of the wind parks in Oaxaca were promoted by the Clean Development Mechanism (CDM), which has not allowed proper public participation mainly due to up-front planned projects. Likewise, international organizations play a relevant role at the local level, on one hand with their financing requirements, and with local organizations (e.g. indigenous communities); and on the other hand, trusting on international agreements (e.g. ILO Convention 169). Some authors coincide with this research, in terms of the social effects of a top-down planning based on international agreements (Garcia Feria, 2018; Lehmann, 2018a; Zárate-Toledo et al., 2019), and the undesirable negative local impacts of CDM projects (Corbera et al., 2017; Lamb et al., 2020). The review provided in chapter II showed that wind projects in the Isthmus of Tehuantepec grew with lack of sufficient regulation, an absence of institutional mediators, as well as insufficient instruments encouraging a fair distribution of benefits. These shortcomings at the institutional setting have deepened inequalities and promoted social conflicts in the region, also seen by (Frate et al., 2019; Gorayeb et al., 2018).

Even when the EIA addresses human aspects, there is a great challenge regarding the consideration and evaluation of social implications. The EIA from the analyzed cases in Mexico did not consider, for example, relevant socio-cultural concerns, such as the undeniable presence of indigenous communities, and therefore the lack of indigenous consultation, but also showed

a limited public participation in general (see Chapter II, III, and IV). The single case study from a fossil energy project showed a very limited public participation as well (in Chapter V), revealing a pattern of public participation shortcomings and procedure failures in the country. Such kind of issues are not new in large-scale projects implementation, and the awareness of the social dimension of (renewable and fossil) energy production is gaining relevance worldwide, and Mexico is not an exception. Thus, the Secretariat of Energy (SENER) issued in recent years new regulations concerning SIA and indigenous consultation, acknowledging the importance of social effects evaluation. I consider the SIA regulation from SENER as a great improvement opportunity, which opens a space for a debate regarding socio-ecological concerns. Its further evolution and performance remain to be seen in the near future, and whether there will be a successful bridge between EIA and SIA, in which an open communication is established, as well as matching results. Both environmental assessments should be recognized as a tool to be adapted and improved, rather than just a procedure to be followed.

Results from Chapter IV showed shortcomings in practice, regarding social concerns evaluation, participation deficits in the case studies, and therefore conflictive dynamics within the local communities. Some of the main social outcomes are: community´ concerns on the effects on the environment, on the community land tenure, and the cultural context, as well as issues on the local acceptance of wind energy. Given the rapid increasing number of wind parks, these aspects are especially important to consider in regards on cumulative impacts in the region, and thus managing the local conflicts and the growing opposition to further wind development in the region. In general, several academic and technical papers refer on social implications of wind energy, especially on the socio-ecological concerns, Chapter III provided a rationale and descriptive framework on the general background and international state of research of on-site wind energy planning, as well as within the case study of the Isthmus of Tehuantepec in the state of Oaxaca, Mexico. As one of my major results I suggest four general classifications of social implications in context of (wind) energy planning. Forecasting such social concerns from the very beginning can lead, in general, in a more participative approach, and can be definitely used for decision making purposes. The classification is presented as follows:

1. Socio-environmental (landscape, noise, shadow flickering);
2. Socio-economic (employment and local economic development; ownership, lease agreements, property tax and compensations; economic chains and interference);
3. Socio-cultural (socio-cultural values, indigenous peoples´ rights); and

4. Stakeholders' engagement (information, consultation and public participation).

1.2. Stakeholders engagement: the process of information, consultation, and public participation within EIA, SIA and the indigenous consultation.

Findings from Chapter IV bring attention to the essential participatory approach from EIA, SIA, and indigenous consultations. The SWOT analysis from the single case study can help us to observe other projects in a similar context in the country, it is evident the lack of participation within the EIA, the SIA, and also weak within the indigenous consultation. In case of the SIA requirements for oil and electric industries, they have not yet triggered a significant indigenous participation; yet the indigenous consultation was the only public participation mechanism in the case study. Having two isolated proceedings (SIA and indigenous consultation) makes public participation even more complicated. Including public participation and an especial indigenous consultation when needed, might facilitate and enrich the social impacts analysis. The current performance of SIA can be clearly improved if public participation (including indigenous consultation) is incorporated. Therefore, a participatory and iterative model was proposed in Chapter IV. It is important to acknowledge that the integration of the indigenous consultation into the SIA process might be seen as a problematic step for the authorities, because both planning instruments are done in an isolated way, EIA and SIA are performed at different time periods by different organisms; therefore public participation in general take place without a logical sequence, which can be even more complicated when indigenous communities should be involved in the process. Nonetheless, in a parallel and appropriated process of both EIA and SIA, not isolated as it is currently, it can be considered as a good opportunity to streamline both processes, and therefore, a potential for accomplishing a meaningful public participation (involving also indigenous communities), and therefore, achieving good governance principles.

Other authors citing my research agreed with the conception of a misguided process of access to information, prior consultation and public participation within the wind energy planning (Pérez-Denicia et al., 2017; Zárate-Toledo et al., 2019), and the perception of a EIA licensing as a bureaucratic procedure, creating more conflicts within the communities (Frate et al., 2019; Gorayeb et al., 2018). While the EIA regulation in Mexico contemplates a public hearing without an especial proceeding when the project affects indigenous communities, the SIA regulation does not consider a general public participation. More documents reported this

statement, leaving other groups with no guarantee of equal involvement (Zárate-Toledo et al., 2019). Yet, the strategy is still in progress, in June 2018, SENER published new legal provisions with a participatory approach for the SIA, opening new possibilities. It will be interesting to see in the short and long term, how this participatory approach will be then understood and performed.

Diverse opportunities were identified in regards of a more participatory EIA, and SIA process (see Chapter V). The indigenous meetings called *Asambleas*, are a good-practice democracy model and a representative public participation form in Mexico (Enrique Gallardo García, 2012). Likewise, the traditional knowledge can be as well a great contribution to the EIA and SIA trough these meetings, showing once more the importance of considering cultural aspects within impact assessments (Hanna et al., 2016; Nzeadibe et al., 2015; Smyth & Vanclay, 2017).

1.3. CA as a qualitative analytical approach

The adoption of the CA as a participative approach to identify the *status quo* of the social and environmental issues within wind projects in the case studies, had advantages and disadvantages. The workshop model, as a participative form, allowed all actors to express their concerns and conceptualize the information in a simple and clear way. Nevertheless, the performance of CA must be well supplemented by other analytical approaches, in order to achieve a deeper analysis. Case study research, semi-structured interviews, and literature and document review helped to support the results. According to findings on Chapter IV, CA could be conducted in project planning processes, facilitating the developers to predict social and environmental concerns from the public at an early stage of the project. Likewise, other authors citing this research work, considered that complex stakeholders' dynamic relationships worth a participative analysis (i.e. CA), which results can achieve a better dialog in the decision making process (Fuentes-Cortés et al., 2019; Hanssen et al., 2018). In EIA processes, CA can be established as a workshop form, assisting for example in the *Scoping* step, with local communities' consultation, and helping to identify the first key concerns on ecological, social and cultural aspects.

2. Final outlook and future prospects for a sustainable energy transition

A more participatory planning process could lead to a more sustainable development and might help not only to reduce social conflicts towards wind energy, but also to allow understanding concerns, needs and limitations of the wind energy development in the region. The first main issue to be dealt with is access to information and participation within the involved stakeholders

and the public in general. In regards of indigenous communities, a culturally sensitive consultation is key for engaging the communities, with clear and proper information at earlier stages of the planning process. It is important as well to consider legal autonomous representation for the communities through the land lease processes. Addressing cumulative effects also in the social context seems to be a great challenge in the short and long-term. Environmental proceedings and regulations are insufficient to provide certainty and ensure public participation. It is required in general, a more participative and democratic energy transition, not only large scale projects but also decentralized schemes and social business (Nagenborg, 2018). Cultural aspects must be also be part of a properly assessment, in order to diminish local conflicts (also seen by Martinez, 2020; Pérez-Denicia et al., 2017). Dissemination of information and permanent education policies can help to achieve a trustworthy relation between stakeholders (Gorayeb et al., 2018), and Mercer et al. (2020) coincide that participatory methodologies can empower communities to decide their own means, especially when the research is directed by themselves.

Mexico needs to build a more comprehensive public policy for renewable energy that considers national, regional and local goals in a more sustainable path of development. Public policies are needed to promote community ownerships as well, social and public investments, science, technology innovation, economic chains, and policies for regional development that create synergies and respect cultural values from the local (indigenous) communities. A participatory planning could lead to a more equitable, social and democratic development, and therefore, reduce social conflicts at the local level, as well to understand the growth opportunities and limits of wind energy in the region. There is an urgent need to develop mandatory regulations and guidelines that reduce and mitigate social-environmental impacts, as well as a close coordination between all levels of government. For example, technical regulations for minimum distance of wind turbines to populations, density of wind parks, height of the turbines, permitted noise. Other regulations are also important, such as land use planning with a participatory planning process, guidelines for land owners in regards of information and fair lease agreements, as well as creating an independent regional agency which guarantees the promotion of sustainable regional development, participatory processes and advisory for local communities. Findings from Chapter IV identified the relevant role of EIA in Mexico´s wind development, concerning social issues analysis, access to information, and public participation mechanisms. This happens also in the environmental context, the Isthmus of Tehuantepec is the most important bird corridor in America stretching from Canada to Central America, however there is a chain of inadequate management of impacts due to lack of monitoring information.

Reinforcing an environmental assessment system through a variety of information access points is essential, as well as an open communication between all levels of government.

The main challenge of regulatory instruments such as EIA and SIA, is integrating an effective public participation within the processes, diffusion of information outside the project as well as participation and contribution of the multiple stakeholders in a project. Public participation within the EIA in our cases (Chapter III) was limited or even non-existent. The public participation within the single case study from Chapter V showed similar performance within the oil industry. Public participation in the EIA process is not yet mandatory, which should be considered to be reformed in the future. Mexico's SIA requirement for planned and future energy projects is a clear step forward regarding social impacts evaluation, it remains to be seen its performance in further projects.

Since public participation shortcomings and a growing local opposition has been the main social issue within wind energy development in Mexico, it is suggested in Chapter II that involvement in the decision-making process and in a financial scheme (e.g. community ownership) might significantly improve public participation and thus local acceptance. Findings on Chapter III and IV showed on one hand barriers for wind community, a lack of an institutional framework and financial incentives. On the other hand, there is a clear opportunity to foster community wind parks and thus increasing public participation at the local level as well as to improve local acceptance. There is a significant interest of diverse stakeholders not only to be passively consulted but also to be actively part of the development, by starting for example a community wind park. It is an undeniable opportunity to foster more democratic alternatives to the large-scale wind parks; i.e. community ownership schemes, small-scale generation. Other authors citing this research work, coincide with the need of community wind parks (Backhouse & Lehmann, 2020; Mercer et al., 2020; Zárate-Toledo et al., 2019). The national setting plays a relevant role in planning and fostering community projects, small-scale projects, as well as to tackle the need of domestic wind energy technology.

3. Overall conclusions

Learning from the Mexican (wind) energy planning in unprivileged regions, like the conflictive Isthmus of Tehuantepec "wind corridor", is key to understand the social dimension of renewable and fossil energy production. Multi-level governance, international climate policies, and top-down planning and vertical decision making play a relevant role in the performance of public participation and such social impacts outcomes.

The overall conclusion of this dissertation substantiates that public participation shortcomings shape social impacts and conflicts at the local setting within wind energy projects, particularly in disadvantaged regions. There are substantial social impacts of wind energy when planning in disadvantaged regions, which are often triggered because of public participation weaknesses. The social issues addressed in the EIA were not sufficient since there are only focused on demographic and geographic information. Although SIA might strongly assist a more profound evaluation of social impacts, especially with indigenous communities, it is not a guarantee. Such a strict statement is too difficult to state, since EIA could better address also socio-cultural aspects at the local level and enhance public participation, involving indigenous communities as well. Both environmental assessments need to be thoroughly improved, also in offering effective public participation mechanisms for all actors.

This research work might contribute to building further analysis and research at the regional and national levels, as well as in another regions or countries with similar development patterns. Further research on enhancing mechanisms for social and environmental issues evaluation, effective public participation instruments within the legal framework of EIA, SIA, and indigenous consultations reinforcement is clearly needed. There is still a limited research on experiences with indigenous communities and renewable energy projects, it is recommended cautiousness and essentially respect in such cases, assisting in empowering communities to decide their own processes. Even though, the results of this research cannot be generalized, they can broaden the research in the Global South as well as on the Global North.

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Annex A: Tables

Document title	Authors	Year	Journal
Resisting renewables: The energy epistemics of social opposition in Mexico	Martinez, N.	2020	Energy Research and Social Science
The effectiveness of the social impact assessment (SIA) in energy transition management: Stakeholders' insights from renewable energy projects in Mexico	Martinez, N., Komendantova, N.	2020	Energy Policy
The Regulation and Policy of Latin American Energy Transitions	Mejía Montero, Adolfo; Alonso Serna Lourdes; Altamirano Allende Carlo	2020	The Regulation and Policy of Latin American Energy Transitions
"That's our traditional way as indigenous peoples": Towards a conceptual framework for understanding community support of sustainable energies in NunatuKavut, Labrador	Mercer, N., Hudson, A., Martin, D., Parker, P.	2020	Sustainability (Switzerland)
New 'renewable' frontiers: contested palm oil plantations and wind energy projects in Brazil and Mexico	Backhouse, M., Lehmann, R.	2020	Journal of Land Use Science
Energy 4 all? Investigating gendered energy justice implications of community-based micro-hydropower cooperatives in Ethiopia	Wiese, K.	2020	Innovation
Are the pens working for justice? News media coverage of renewable energy involving Indigenous Peoples in Canada	Walker, C., Alexander, A., Doucette, M.B., (...), Stefanelli , R., Castleden, H.	2019	Energy Research and Social Science

Procedural and distributive justice inform subjectivity regarding wind power: A case from Rio Grande do Norte, Brazil	Frate, C.A., Brannstrom, C., de Morais, M.V.G., Caldeira-Pires, A.D.A.	2019	Energy Policy
Justice, social exclusion and indigenous opposition: A case study of wind energy development on the Isthmus of Tehuantepec, Mexico	Zárate-Toledo, E., Patiño, R., Fraga, J.	2019	Energy Research and Social Science
Water-Energy Off-Grid Systems Design Using a Dominant Stakeholder Approach	Fuentes-Cortés, L.F., Ortega-Quintanilla, M., Flores-Tlacuahuac, A.	2019	ACS Sustainable Chemistry and Engineering
Conditions accommodating a dominant stakeholder in the design of renewable air conditioning systems for tourism complexes	Hernández-Romero, I.M., Fuentes-Cortés, L.F., Nápoles-Rivera, F.	2019	Energy
Renewable energy consumption: The effects on economic growth in Mexico	Mele, M.	2019	International Journal of Energy Economics and Policy
Wind power on the Brazilian Northeast Coast, from the Whiff of Hope to Turbulent Convergence: The case of the Galinhos Wind Farms	Dantas, E.J.A., Rosa, L.P., da Silva, N.F., Pereira, M.G.	2019	Sustainability (Switzerland)
Integrated hydro- and wind power generation: a game changer towards environmental flow in the Sub-middle and Lower São Francisco River Basin?	Koch, H., Silva, A.L.C., de Azevedo, J.R.G., (...), de Lima Barros, A.M., Hattermann, F.F.	2018	Regional Environmental Change
Spatial Multi-Criteria Decision Analysis Tool Suite for Consensus-Based Siting of Renewable Energy Structures	Hanssen, F., May, R., Van Dijk, J., Rød, J.K.	2018	Journal of Environmental Assessment Policy and Management

Wind power gone bad: Critiquing wind power planning processes in northeastern Brazil	Gorayeb, A., Brannstrom, C., de Andrade Meireles, A.J., de Sousa Mendes, J.	2018	Energy Research and Social Science
The conflict surrounding wind power projects in the Mexican Isthmus of Tehuantepec. Renewable energies and politics of scale«	Lehmann Rosa	2018	Bioeconomy & Inequalities, Jena
Wind Power and Environmental Justice: The Case of Istmo de Tehuantepec	Yajaira Garcia Feria	2018	Green crime in Mexico (Book) Palgrave Studies in Green Criminology
Towards a participatory renewable energy transition in Latin America : social enterprises and the promotion of decentralized solar energy systems	Nagenborg, Sebastian	2018	Norwegian University of Life Sciences (Thesis)
Thirty years of North American wind energy acceptance research: What have we learned?	Rand, Joseph, Hoen Ben	2017	Energy Research and Social Science
Renewable energy sources for electricity generation in Mexico: A review	Pérez-Denicia, Eduardo & Fernández-Luqueño, Fabián & Vilariño-Ayala, Darnes & Manuel Montaño-Zetina, Luis & Alfonso Maldonado-López, Luis	2017	Renewable and Sustainable Energy Reviews
Climate change policies, land grabbing and conflict: perspectives from Southeast Asia	Corbera, Esteve, Hunsberger, Carol, Vaddhanaphuti	2017	Canadian Journal of Development Studies / Revue canadienne d'études du développement

Future Research Directions to Reconcile Wind Turbine–Wildlife Interactions	Roel May, Andrew B. Gill, Johann Köppel, Rowena H.W. Langston, Marc Reichenbach, Meike Scheidat, Shawn Smallwood, Christian C. Voigt, Ommo Hüppop and Michelle Portman	2017	Wind Energy and Wildlife Interactions (Book)
Analysis of the effectiveness of national renewable energy policies: A case of photovoltaic policies	Hafeznia, Hamed, Aslani, Alireza, Anwar, Sohail, Yousefjamali, Mahdis	2017	Renewable and Sustainable Energy Reviews

Table 1 Selection of the most relevant documents citing my previous research (Out of 56 cites as of 4th, November 2020).

	Place	**Interviewee**	**Date**
1	Juchitán, Oaxaca	CEO local wind energy company with international support	13.02.14
2	Juchitán, Oaxaca	Chief representative transnational wind energy company	13.02.14
3	Juchitán, Oaxaca	Social representative transnational wind energy company	14.02.14
4	Juchitán, Oaxaca	Energy municipality authority (Regidor de Energía)	14.02.14
5	Santo Domingo Ingenio, Oaxaca	Local representative (Comisario Ejidal)	14.02.14
6	Juchitán, Oaxaca	Local university professor	14.02.14
7	Santo Domingo Ingenio, Oaxaca	Local farmer without leased land	15.02.14
8	Santo Domingo Ingenio, Oaxaca	Local farmer with leased land	15.02.14
9	Santo Domingo Ingenio, Oaxaca	Representative of local committee	15.02.14
10	Juchitán, Oaxaca	Representative national wind energy company	17.02.14
11	La Venta, Oaxaca	Representative local opposition group	19.02.14

12	Tehuantepec, Oaxaca	Three local university professors	21.012.14
13	Tehuantepec, Oaxaca	Local university professor	21.012.14
14	Ixtepec, Oaxaca	Three community wind project members	22.04.14
15	Oaxaca de Juárez, Oaxaca	Representative regional energy authority (Energías renovables de la Secretaría de Turismo)	28.02.14
16	Oaxaca de Juárez, Oaxaca	CEO local small-scale energy projects company	28.02.14
17	México, D.F.	Official from Climate change policies department from the environmental authority (SEMARNAT)	28.06.15
18	México, D.F.	Official from Sustainability department from the energy authority (SENER)	18.05.15
19	México, D.F.	Official from Social impact department from the energy authority (SENER)	20.05.15
20	México, D.F.	Researcher from Law Sciences Institute, UNAM	20.05.15
21	Germany	Representative Latin-America department of German development bank (KfW)	11.04.16

Table 2 Semi-structured interviews

	Place	**Approach from**	**Participants**	**Date**
1	Unión Hidalgo, Oaxaca	Private wind park	Four landowners and moderator	13.03.14
2	Ixtepec, Oaxaca	Community wind park	Three active community members and moderator	23.02.14
3	Juchitán, Oaxaca	Opposition to wind parks	One representative and moderator	12.03.14
4	Mexico City	Academic experts	Three university academics from Oaxaca and Mexico City and moderator	14.03.14
5	Potsdam, Germany	Wind energy company	Two staff members and moderator	16.05.13

Table 3 List of CA workshops

	Place	Meeting	Topic	Date
1	Unión Hidalgo, Oaxaca	Asamblea comunitaria	Private wind parks	19.02.14
2	San Dionisio del Mar, Oaxaca	Asamblea comunitaria	Private wind park (not yet constructed)	19.02.14
3	San Francisco del Mar, Oaxaca	Asamblea comunitaria	Private wind park (not yet constructed)	20.02.14
4	Ixtepec, Oaxaca	Informal meeting	Community wind park (planned)	21.02.14
5	Zapote, Oaxaca	Informal meeting	Community wind park (planned)	23.02.14

Table 4 Focus group discussion

Case	Subject and main findings	Methodology for analysis	Date and place	Participants
Case 1 Wind Park Piedra Larga	Conflicts and concerns within a private wind park financed by international institutions, sited on community indigenous land.	CA in a workshop basis, semi-structured interviews, and focus group discussions.	March 2014 in the municipality of Unión Hidalgo, Oaxaca	Four landowners, who are leasing the land to the wind company. The author of this dissertation as moderator
Case 2 Community wind park Ixtepec	Institutional barriers as well as the challenges for a wind project developed by the members of indigenous community land (community wind park).	CA in a workshop basis, semi-structured interviews, and focus group discussions.	February 2014 in the municipality of Ixtepec	Main promoter of the project, three active project members. The author of this dissertation as moderator
Case 3 Other stakeholders´ perspectives and concerns	1) scientific-academic perspective held in, 2) a wind energy company with interest in wind parks in the area carried out in, and 3) indigenous	CA in a workshop basis, and semi-structured interviews,	March 2014 in Mexico and Oaxaca cities, 2) May 2013 in Germany, and 3) March 2014 in the	Three researchers, two wind energy company representatives, and two members of the main

	peoples' opposition representatives		municipality of Juchitán de Zaragoza, Oaxaca	opposition group in the region. The author of this dissertation as moderator
Case 4 Campo Malva oil extractive industry in the Chiapas state	The permitting requirements concerning public participation, the EIA, the SIA, as well as the prior consultation to indigenous communities.	SWOT analysis, and single-case study	April 2018	

Table 5 Summary of the general characteristics of the analyzed case studies

Annex B: English translation of publication No.4

This is an unofficial translation of the publication No. 4 from Spanish to English

PUBLIC PARTICIPATION AND FREE, PRIOR AND INFORMED CONSULTATION IN MEXICO: THE CASE CAMPO MALVA

María Elena HUESCA PÉREZ *

Marisol ANGLÉS HERNÁNDEZ **

Johann KÖPPEL ***

Summary: I. Introduction, II. Methodology: SWOT analysis and case study, III. Legal framework for public participation in Environmental Impact Assessments and Social Impact Assessments in Mexico, IV. Case study: Fossil fuels exploration and extraction industry, Campo Malva, Chiapas, V. SWOT analysis of public participation in Impact Assessments, VI. Discussion and recommendations, VII. Conclusions, VIII. Bibliography.

I. INTRODUCTION

The Environmental Impact Assessment (EIA) is an environmental policy instrument that seeks to prevent and/or minimize the negative environmental impacts of works and/or activities. In emerging countries, different challenges, among others, failures in institutional capacities regarding methodology and evaluation criteria. One of the most important failures is the insufficiency of mechanisms for public participation, which, depending on the case, should include indigenous communities;[1] there is also a certain amount of discretion in determining the consultation process, as well as in the binding nature of the results of the consultation for the redefinition of the project. As a

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[1] Arnold, Lauren y Hanna, Kevin, *Best Practices in Environmental Assessment: Case Studies and Application to Mining*, Vancouver, Canadian International Resources and Development Institute, 2017, p. 10.

consequence, scarcely public input into the EIA process; and, there is little transparency on the part of the proponents and government officials involved. [2]

In general terms, public participation is defined as the participation of groups and individuals who would be positively or negatively affected by a proposed intervention, or those who are interested in it. [3]At the international level, there are diverse legal provisions that regulate environmental public participation; for example, the 1991 Espoo Convention on EIA in a transboundary context, [4]and the 1998 Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters. [5]

The right to participation is part of the so-called rights of access: to information, participation and justice, which derive from Principle 10 of the Rio Declaration of 1992 and today are at the center of the new roadmap for sustainable development, adopted by the United Nations in 2015, Agenda 2030, consisting of 17 Sustainable Development Goals (SDGs).[6] Specifically, 16 groups the three rights together, as it mandates States to ensure: (i) public access to information and protection of fundamental freedoms; (ii) inclusive, participatory and representative decision-making; and (iii) equal access to justice. The Agenda also calls for the creation of effective,

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[2] Appiah-Opoku, Seth y Hobson, C. Bryan, "EA Follow-up in the Ghanaian Mining Sector: Challenges and Opportunities"*, Environmental Impact Assessment Review*, Vol. 41, July, 2013, pp. 38-44. https://doi. org/10.1016/j.eiar.2013.02.003.

[3] André, Pierre L., *et al., Public Participation International: Best Practice Principles*, USA, International Association Impact Assessment, 2006, p. 1.

[4] United Nations Economic Commission for Europe, *Convention on Environmental Impact Assessment in a Transboundary Context,* Geneva, UNECE, 2015. Disponible en: https://www.unece.org/index.php?id=40450&L=0.

[5] Noble, Bram F., *Introduction to Environmental Impact Assessment : A Guide to Principles and Practice*, 3rd. ed. , United Kingdom, Oxford University Press, 2015, p. 217; y United Nations Economic Commission for Europe, *Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters,* Geneva, UNECE, 1999. Disponible en: https://www.unece.org/env/pp/treatytext.html.

[6] United Nations, *Transforming Our World: The Agenda 2030 for Sustainable Development,* New York, UN, 2015.

accountable, and transparent institutions and the adoption of non-discriminatory laws and policies for sustainable development. [7]

In the Latin American context, on March 4, 2018, it was adopted the Regional Agreement on Access to Information, Public Participation and Access to Justice in Environmental Matters in Latin America and the Caribbean, known as the Escazú Agreement. [8]

In a global context, it is recognized that indigenous communities may be particularly vulnerable to the loss, dispossession or exploitation of their territories and access to their natural and cultural resources in the face of certain development activities or projects. Therefore, in the event of possible negative impacts on indigenous communities, free, prior and informed consultation (CPLI) is required and, in certain cases, their consent must be obtained. [9]The latter is stronger than the right to be consulted, as it implies the possibility of approving the implementation of a project or activity. [10]Although international regulations do not require unanimous consent, it is a key element for the realization of the project. [11]

In some Latin American countries, the CPLI for extractive projects has already a long history, in Bolivia since 2007 and in Peru since 2012; despite the limitations, as a rule, extraction projects are of "national interest", so consultation is not a determining

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[7] Anglés Hernández, Marisol, "El principio de acceso a la justicia ambiental", in Aguila, Y., De Miguel, C., Tafur, V. and Parejo, T. (eds.), *Principios* de *Derecho Ambiental y Agenda 2030,* Valencia, Tirant lo Blanch, 2019, p. 223.

[8] Economic Commission for Latin America and the Caribbean, *Regional Agreement on Access to Information, Public Participation and Access to Justice in Environmental Matters in Latin America and the Caribbean,* Chile, ECLAC, 2018

[9] Parkins, J. R. y Mitchell, R. E., "Social impact assessment: A review of academic and practitioner perspectives and emerging approaches", en Hanna, K. S., (ed.), *Environmental Impact Assessment: Practice and Participation,* 3rd. ed., Canada, Oxford University Press, 2016, pp. 122-140.

[10] Flemmer, Riccarda y Schilling-Vacaflor, Almut, "Unfulfilled Promises of the Consultation Approach: The Limits to Effective Indigenous Participation in Bolivia's and Peru's Extractive Industries", *Third World Quarterly*, Vol. 37, núm. 1, 2016, p. 172.

[11] Parkins, J. R. y Mitchell, R. E., "Social impact assessment *..., op. cit.* , p. 124.

factor in the realization of such projects.[12] In Brazil, environmental licenses involve a public hearing procedure and in the case of indigenous communities, a free, prior and informed consent process according to the International Labour Organization's Convention 169 concerning Indigenous and Tribal Peoples in Independent Countries (Convention 169), in addition to the use of traditional knowledge for mitigation measures. [13]

In Mexico, the EIA is provided by the General Law of Ecological Balance and Environmental Protection (LGEEPA) in its article 28 and 5th of its Regulations on Environmental Impact, which presents different structural flaws regarding public participation, the analysis of social aspects, as well as the lack of evaluation of indirect impacts, [14]among others. For the purpose of this paper, we refer only on the public participation processes of the EIA, the social impact assessment (EIS), and the CPLI - the latter applicable to indigenous communities exclusively.

According to the Mexican Center for Environmental Law (CEMDA), the EIA process has the following limitations: 1) the public consultation does not concur with international standards on the subject; 2) there is no right to consultation, only the right to request it; 3) there is no special procedure for consulting indigenous peoples and communities; 4) there is no effective access to information; 5) the dissemination media (Gaceta Ecológica) is difficult to access and consult, and 6) there is no link of the opinions expressed in the participatory processes for decision-making.

The consultation regulated in the federal EIA procedure does not refer to the social or cultural impact of the works or projects subject to evaluation, and therefore ignores the destruction of a set of human, cultural, and social values associated with community practices of natural resource use. It should not be confused or used as if it

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[12] Flemmer, Riccarda and Schilling-Vacaflor, Almut, "Unfulfilled ..., *op. cit*.

[13] Hanna, Philippe *et al.,* "Improving the Effectiveness of Impact Assessment Pertaining to Indigenous Peoples in the Brazilian Environmental Licensing Procedure", *Environmental Impact Assessment Review,* Vol. 46, April 2014, pp. 58-67.

[14] Centro Mexicano de Derecho Ambiental, *Modifications to the Environmental Impact Assessment Procedure,* Mexico, CEMDA, 2014 Available at: http://www.cemda.org.mx/modificaciones-al-procedimiento-de-evaluacion-de-impacto-ambiental-eia/.

were the consultation procedure protected under the international human rights system, since its structure and operating logic do not have the same purpose. [15]

In 2014, as a result of the national energy reform, the Ministry of Energy (SENER) requires as a mandatory requirement that those promoting fossil fuels and electricity generation projects should present an EIS, from which, if there is a possibility of affecting indigenous peoples and communities, SENER itself would have to carry out the CPLI.[16] In accordance with Article 6 of Convention 169, to which the Mexican State is part of, any legislative or administrative measure that could directly affect these collectives must be submitted for consultation. However, the Hydrocarbons Law (LH) states that the use, enjoyment or affectation of the land or goods necessary for the extraction or production of hydrocarbons will be negotiated by the interested parties, or through a court whose decision "must privilege" the development of the hydrocarbons industry. [17] It implies that the consultation and, above all, the consent, become to second term, since fossil fuels projects are preferential over any other activity susceptible to be carried out on the land, which denotes a certain imposition and, therefore, collision of rights. [18]

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[15] Anglés Hernández, Marisol, García Altamirano, Edgar and López Belda, Adriana, "Racionalidad legal, consulta ambiental y lucha de los pueblos indígenas por el desarrollo propio", in Gutiérrez Rivas, R. and Burgos Matamoros, M. (coords.), *Globalización, Neoliberalismo y Derechos de los Pueblos Indígenas en México,* México, UNAM, Instituto de Investigaciones Jurídicas, 2020, p. 226. Available at: https://archivos.juridicas.unam.mx/www/bjv/libros/12/5844/9.pdf.

[16] *Regulations to the Hydrocarbons Law,* Mexico, Official Gazette of the Federation, October 31, 2014 Available at: http://dof.gob.mx/nota_detalle.php?codigo=5366671&fecha=31/10/2014 and *Regulations to the Law on the Electrical Industry,* Mexico, Official Gazette of the Federation, October 31, 2014. Available at: http://dof.gob.mx/nota_detalle.php?codigo=5366665&fecha=31/10/2014.

[17] *Regulations to the Hydrocarbons Law, ..., op. cit*.

[18] Anglés Hernández, Marisol, "Desarrollo energético vs. Sustentabilidade ambiental", in Carmona Lara, M. del C. A. and Acuña Hernández, A. L. (coords.), *La Constitución y los derechos ambientales,* México, UNAM, Instituto de Investigaciones

Likewise, there is no link between the EIA and EIS, nor is there a link between public consultation - applicable to anyone in the community surrounding the project or work - and CPLI. The public consultation is the responsibility of the Ministry of the Environment and Natural Resources (SEMARNAT) and CPLI, which corresponds to that regulated in Convention 169, [19]to SENER, and there is even a conflict of interest for the latter, since on the one hand it is responsible for promoting energy development and, at the same time, guaranteeing the rights of indigenous peoples and communities in relation to energy projects. In addition, the SIA, which is also the responsibility of SENER, lacks consultation with the general public, which has led to confusion and disagreement. [20]

The Inter-American Court of Human Rights has held that the approval of projects capable of affecting natural resources and/or the survival of indigenous peoples can only be granted after three fundamental guarantees: 1) effective participation (good faith consultations that allow peoples to truly expose their perspectives and influence decision-making); 2) benefit sharing; and, 3) prior environmental and social impact studies.[21] The case of Mexico, the current regulations on EIA focus on identifying measures that could be taken to mitigate negative environmental effects; however, as the Special Rapporteur on the Rights of Indigenous

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Jurídicas-CONACYT, 2015, pp. 33-51. Available at: http://bibliohistorico.juridicas.unam.mx/libros/9/4089/6.pdf.

[19] Anglés Hernández, Marisol, "El derecho a la consulta libre, previa y informada no es la consulta regulada en el procedimiento de evaluación del impacto ambiental", *Idearios Jurídico-Ambientales,* Tomo III, Impacto Ambiental, México, Secretaría de Medio Ambiente y Recursos Naturales-Gobierno del Estado de Quintana Roo, 2013, pp. 8-22 Available at http://biblioteca.semarnat.gob.mx/janium/Documentos/Ciga/Libros2011/229481.pdf.

[20] Rousseau, Isabelle, "The new regulation of the social management of energy projects in Mexico Seguridad, sustentabilidad y gobernabilidad", *Revista Mexicana de Ciencias Políticas y Sociales,* Vol. 62, No. 230, 2017, p. 213.

[21] Organization of American States, *Indigenous and Tribal Peoples' Rights to Their Ancestral Lands and Natural Resources: Standards and Jurisprudence of the Inter-American Human Rights System,* OAS, Washington, D.C., 2009, p. 93.

Peoples warns, they do not contain general scopes that cover all issues relevant to the communities affected by the project. [22]

Under this logic, this article emphasizes the fundamental character of public participation in the EIA, EIS and CPLI procedures; based on an analysis of the strengths, opportunities, weaknesses and threats (SWOT) of the case study Campo Malva; which opens a discussion on the opportunities identified in the analysis. Finally, some recommendations are made that could be extended to other cases in order to strengthen the current performance of consultations (public and indigenous) and public participation, both in the EIA and the SIA; specifically, an iterative process model of the EIA/SIA is referred to with the relevance of integrating public consultation and CPLI in the SIA; pointing out the objectives of including public participation in each of the phases of the EIA and the SIA.

II. METHODOLOGY: SWOT ANALYSIS AND CASE STUDY

SWOT analysis has originally been used in business and institutional settings; however, it has also been applied in other fields, including environmental planning and EIA.[23] In SWOT analysis, strengths and weaknesses are the internal factors of a system, while opportunities and threats are the external factors. For this analysis: 1) the single case study was the extractive activities development project related to the Campo Malva, located in Chiapas; 2) a systematic review of literature was carried out with publications relevant to the single case study and the issues of public participation in the EIA, EIS and CPLI, and 3) the legal framework applicable to public participation in Mexico in the EIA, EIS and CPLI processes was identified.

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[22] MacKay, Fergus, *Compilation of Jurisprudence of the UN Treaty Bodies and Recommendations of the Human Rights Council and its Special Procedures and the Advice of the Expert Mechanism on the Rights of Indigenous* Peoples, United Kingdom, Forest Peoples Programme, 2013, pp. 154-155

[23] Jha-Thakur, Urmila y Fischer, Thomas B., "25 Years of the UK EIA System: Strengths, Weaknesses, Opportunities and Threats", *Environmental Impact Assessment Review,* Vol. 61, November, 2016, pp. 19-26; Paliwal, Ritu, "EIA Practice in India and Its Evaluation Using SWOT Analysis", *Environmental Impact Assessment Review*, Vol. 26, núm. 5, 2006, pp. 492-510; Glasson, John, "The First 10 Years of the UK EIA System: Strengths, Weaknesses, Opportunities and Threats", *Planning Practice & Research,* Vol. 14, núm. 3, 1999, pp. 363-375.

The justification for analyzing a single case study is based on the following conditions: [24]a) it represents a significant contribution to the study of public participation in the EIA, EIS and CPLI; b) it shows clearly the limitations of access to information; furthermore, it is an exceptional case due to the cancellation of the project due to the rejection of indigenous communities; c) it allows for the analysis of public participation in an extractive project within the framework of the energy reform; and; d) it constitutes an indicator of what happens or could happen in other similar projects in the current Mexican context.

III. LEGAL FRAMEWORK FOR PUBLIC PARTICIPATION IN ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENTS IN MEXICO

In Mexico, the EIA is the legal instrument endorsed by the LGEEPA, as well as by its Regulations on Environmental Impact Assessment (RLGEEPAEIA). Both regulatory instruments determine public consultation and public information gathering, but not the CPLI or the EIS. Likewise, the LGEEPA incorporates public consultation in the Land-use Planning Programs, and in the preliminary drafts of Mexican Official Standards (NOM) that are prepared within the framework of the National Committee for Standardization in matters of Natural Resources (COMARNAT). In turn, [25]with the objective of promoting renewable energy sources, the Law for the Use of Renewable Energies and the Financing of Energy Transition prescribed the holding of public meetings and consultations for projects larger than 2.5 MW;[26] however, the Energy

[24] Yin, Robert K., *Case Study Research: Design and Methods*, 5th. ed., Thousand Oaks, USA, Sage 2014, p. 47.

[25] *Ibidem,* articles 20 Bis and 20 Bis 5, fraction VII. See Anglés Hernández, Marisol, "La participación pública para la sostenibilidad en México, *Revista Internacional de Direito Ambiental,* Brasil, Ano II, no. 6, setembre/dezembre, 2013, p. 221.

[26] Article 21, section I, *Law for the Use of Renewable Energies and Financing of the Energy Transition,* Mexico, Official Gazette of the Federation, November 28, 2008 Abrogated.

Transition Law that abrogated it, in clear regression, no longer contemplates such consultation mechanisms. [27]

Strictly speaking, the public consultation in the EIA can be requested by any concerned person in the community, within the first ten days of the publication of the project in the Ecological Gazette, however, it is up to the authority to decide, if this is done, [28]evidencing the discretion of the authority. Nevertheless, in light of the public interest, related to the environment, and the pro person principle, the authority could be required to carry out the public consultation procedure, as a fundamental element of the right to a healthy environment.

The LGEEPA also states that a public information meeting should be held 25 days after the start of the public consultation, when the project could cause serious ecological imbalances or damage to public health or ecosystems. [29]Therefore, the participation of government authorities, academic institutions, and social and business organizations is also included. Both public participation processes are managed by SEMARNAT. It should be noted that the LGEEPA dates from 1996, and to date has not been modified with respect to public participation; therefore, it should be interpreted in light of all the constitutional changes that protect human rights.

It is essential to note that, the participation of indigenous communities is not legally included in the EIA process. However, LGEEPA does consider their participation in other environmental policy instruments, such as the decree and program of natural protected areas, ecological restoration programs, biodiversity programs, as well as in the environmental planning system. [30]As a result of the energy reform, SENER established as a mandatory requirement, prior to the implementation

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[27] *Ley de Transición Energética,* Mexico, Diario Oficial de la Federación, December 24, 2015. Available at: http://www.diputados.gob.mx/LeyesBiblio/pdf/LTE.pdf.

[28] Article 34, section I, *General Law of Ecological Equilibrium and Environmental Protection,* Mexico, Official Gazette of the Federation, January 28, 1988 Reforms of December 13, 1996.

[29] Article 34, section III, *General Law of Ecological Equilibrium and Environmental Protection ..., op. cit.*

[30] Articles 58 and 78, *General Law of Ecological Equilibrium and Environmental Protection ..., op. cit.*

of energy projects, the elaboration of a "free, prior and informed consultation with indigenous peoples" for hydrocarbon [31]and electricity generation projects. [32]

In order to improve the processes of participation in the EIA and the SIA, it is essential to guarantee access to information; in this regard, the provisions of the Federal Law of Transparency and Access to Public Information (LFTAI) are relevant, [33]which oblige SEMARNAT and SENER to give access to information concerning authorized projects, through environmental assessments; as well as the information related to CPLI procedures; however, neither the Hydrocarbons Law nor the Electric Industry Law make reference to this, although the LGEEPA does, through the environmental impact assessment procedures. [34]Likewise, the General Law of Transparency and Access to Public Information (LGTAI) determines the transparency obligations common to environmental impact documents (see figure 1). [35]

Figure 1. Legal framework for public participation in EIA and other environmental policy instruments and transparency in Mexico

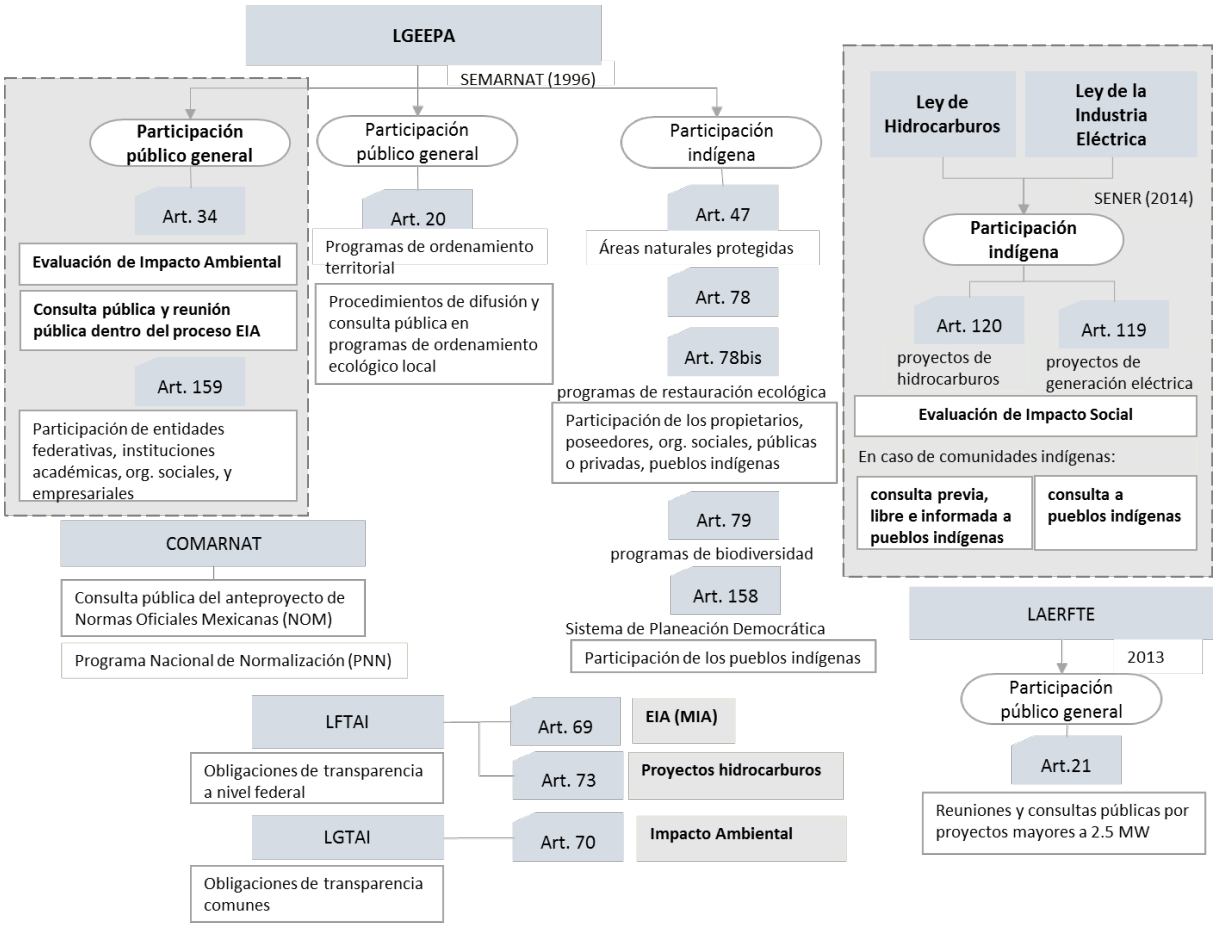
[31] Articles 85 to 87, *Regulations to the Hydrocarbons Law*, *..., op. cit.*

[32] Articles 89 to 92, *Regulation of the Law on the Electrical Industry*, *..., op. cit.*

[33] Articles 69, section VII, subsection I and 73, section IV, subsection d, respectively. *Ley Federal de Transparencia y Acceso a la Información Pública,* Mexico, Diario Oficial de la Federación, May 9, 2016. Amendments of January 27, 2017.

[34] Regulations to the Hydrocarbons Law, *..., op. cit.*

[35] Article 70, section XXVIII, paragraphs a and b, paragraph 8, in both sections. *Ley General de Transparencia y Acceso a la Información Pública,* Mexico, Diario Oficial de la Federación, May 4, 2015.



Source: Own elaboration based on the above mentioned regulations. [36]

IV. CASE STUDY: HYDROCARBON EXPLORATION AND EXTRACTION INDUSTRY, CAMPO MALVA, CHIAPAS

The selection of this single case study was determined first, by the availability of information on the project, as the EIA, EIS and CPLI documents are officially published, which has been difficult to find in other cases. Second, it is especially interesting because after having initiated the CPLI, SENER decided to cancel the contract due to the rejection of the indigenous communities.

Contract area 11, called the Campo Malva, is located in the so-called *Chiapas Block,* which is part of several of the fields tendered by the Canadian oil company

[36] Ministry of Energy, *Previous Consultation on Hydrocarbon Exploration and Extraction Activities in the Contractual Areas 10 and 11 of Round 2.2,* Mexico, SENER, 2017. Available at: https://www.gob.mx/sener/acciones-y-programas/consulta-previa-sobre-las-actividades-de-exploracion-y-extraccion-de-hidrocarburos-en-las-areas-contractuales-10-y-11-de-la-ronda-2-2.

Renaissance Oil Corp, S. A., de C. V., in Mexico.[37] It was the first foreign company to produce oil in Mexico after the energy reform of 2013. It has also become the second largest oil producer in the country, after the national oil company Petróleos Mexicanos (PEMEX).[38] In May 2016, *Renaissance Oil Corp, S. A., de C. V.,* signed several 25-year contracts for the extraction of crude oil and natural gas from some existing fields, one of them the Campo Malva (previously operated by PEMEX). [39]

Historically, in the state of Chiapas there is a strong legacy of indigenous movements and social protest, which reached visibility through the Zapatista Movement for National Liberation (EZLN), so it is not surprising that, in June 2017, around 6,000 members of Zoque indigenous communities protested in rejection of the extraction of hydrocarbons in the state; just a few hours after the CPLI process was extended.[40] The project is currently cancelled, after SENER asked in 2017 to exclude this area from the bidding process because the CPLI process had been extended. It should be noted that the tender for this field can be resumed later[41] . Regarding the

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[37] Renaissance Oil Corp, S. A. de C. V., *Renaissance Is Developing a High Quality, Diversified Shale and Mature Fields Portfolio for Development in Mexico,* Renaissance Oil Corp Operations, 2018. Diponible en: http://renaissanceoil.com/operations/.

[38] Oil & Gas Magazine, "Renaissance *Oil The* First Foreign Oil Company to Produce in Mexico," Oil *& Gas Magazine,* June *20,* 2016, p. 1. Available at: https://oilandgasmagazine.com.mx/renaissance-oil-la-primera-petrolera-extranjera-en-producir-en-mexico/.

[39] *Ibidem.*

[40] Gómez, Magdalena, "Zoques: To consult or to respect the territory? "*La Jornada*, Mexico, June 27, 2017. Available at: https://www.jornada.com.mx/2017/06/27/opinion/014a1pol.

[41] El Financiero, "Indígenas ganan primer round a la SENER por ronda 2.2", *El Financiero,* Mexico, June 21, 2017. Available at: https://www.elfinanciero.com.mx/economia/sener-pide-excluir-dos-bloques-en-chiapas-de-la-ronda-por-consulta; Miranda, Juan, "Para completar consulta a comunidades retiran 2 áreas de la ronda 2.2", *La Jornada,* Mexico, June 23, 2017, p. 22; and Oil & Gas Magazine, "Prolonga SENER proceso de consulta en comunidades indígenas en Chiapas para áreas de la ronda 2.2", Oil *& Gas Magazine, Mexico*, June

official documents on EIA, EIS and CPLI, there are several points for consideration, which are address as follows.

4.1 Environmental Impact Assessment

As a result of the energy reform, the National Agency for Industrial Safety and Environmental Protection of the Hydrocarbons Sector (ASEA) was created in 2015, as a decentralized administrative body of the SEMARNAT, empowered to exclusively regulate the activities of the hydrocarbons sector, from exploration to sale to the final consumer, in the aspects of industrial safety and environmental protection. Despite various expressions of rejection, on August 11, 2014 the Law of the Agency was published in the Official Journal of the Federation (DOF), empowering it, among others, to issue authorizations regarding environmental impact and risk of the hydrocarbons sector. [42]

So, the Environmental Impact Assessment (EIA) for the Campo Malva was evaluated by the newly created ASEA. According to information contained in the MIA, the Campo Malva is located in the most prolific oil and gas area of the country, the so-called southeast oil basin. The document states that there is no significant adverse environmental impact from extractive activities, so there will be no irreversible damage to the ecosystem.[43] Among the considerable environmental impacts identified by the MIA is the generation of greenhouse gases (GHG) and effects on the quality of the landscape. In addition, possible cumulative impacts from the process of deforestation

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22, 2017, p. 1. Available at: https://www.oilandgasmagazine.com.mx/2017/06/prolonga-sener-proceso-consulta-en-comunidades-indigenas-en-chiapas-areas-la-ronda-2-2/#.WWPVqYSGOM8.

[42] *Law of the National Agency for Industrial Safety and Environmental Protection of the Hydrocarbons Sector*, Mexico, Official Gazette of the Federation, August 11, 2014.

[43] Renaissance Oil Corp, S. A., de C. V., *Regional Environmental Impact Statement (MIA-R) for Contract Areas 11 (Malva Field), 15 (Mundo Nuevo Field) and 25 (Topén Field),* Mexico, Renaissance Oil Corp, S. A., de C. V., 2017, p. 10. Available at: https://rondasmexico.gob.mx/media/4412/1-mia-cnh-r01-l03-a11-2015-malva-reinassance-v2.pdf.

and loss of water resources in the region. Therefore, the document proposes some mitigation measures and an environmental monitoring program. [44]

With respect to public participation in the Campo Malva EIA process, it is important to note that any mechanism for public consultation or public meetings in which potentially affected parties could express themselves was documented.

4.2 Social Impact Assessment

The SIA allows for the identification and implementation of actions to contribute to the sustainability of the project and the respect for human rights during the life of the project activities.[45] In accordance with article 121 of the LH, those interested in obtaining a permit or authorization to develop projects in this area - assignees and contractors - must present the SENER with an SIA that must contain the identification, characterization, prediction and assessment of the social impacts that could result from their activities, as well as the corresponding mitigation measures and social management plans. [46]

Although the SIA has a resolution that may include recommendations made by the SENER, it does not imply an authorization of the project. However, the resolution must be presented by the developer for the purposes of environmental impact authorization. When the SENER reviews the SIA and determines that the area contains indigenous peoples and communities susceptible to being affected by the project, the SENER must proceed to carry out the CPLI, through the General Directorate of Social Impact and Occupanzy, which will notify the developer of the origin of this procedure as stipulated in article 120 of the LH. [47]

As for the SIA of the Campo Malva Project, it is important to point out that it did not contemplate significant public participation in any of its phases. Instead, 12 semi-structured interviews were carried out with relevant actors to the project; as well as, questionnaires to collect demographic and perception data in only one of the locations of the project area. In this way, two positive social impacts were identified (inputs for housing, payments for land occupation) and six negative ones (damage to roads,

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[44] *Ibidem*.

[45] Secretaría de Energía, *Consulta Previa sobre las Actividades de Exploración y Extracción..., op. cit.*

[46] *Regulations to the Hydrocarbons Law, ..., op. cit.*

[47] *Ditto.*

segregation of inhabitants due to land delimitation, lack of connection between PEMEX and the community, lack of local employment, contamination and decrease in traditional crops). It should be noted that from the demographic and geographic analysis of the area, the presence of indigenous people was identified in four locations located within the project's area: 3rd Section Santa Cruz, Sunuapa, 2nd Section Santa Cruz, and Pichucalco; specifically, the municipalities of Pichucalco and Sunuapa are catalogued as "Dispersed Indigenous Population"; however, because the indigenous population is not representative in 90% of the localities in the Contractual Area of the Campo Malva, the promoter considered that CPLI was not necessary; [48][49]However, this determination does not correspond to the promoter, but to the SENER's Deputy General Directorate for Social Impact Assessment and Prior Consultation, which, once it has corroborated the information provided by the promoter, through the Catalogue of Indigenous Localities CDI, 2010, reiterated that the indigenous consultation was not necessary.

Thus, through a working meeting held between representatives of the SENER's Deputy General Directorate of Social Impact Evaluation and Prior Consultation, the General Secretariat of Government of the State of Chiapas and the municipal presidents of Francisco León, Tecpatán, Pichuchalco and Ixtacomitán of the State of Chiapas, it was agreed to conduct a consultation of the indigenous communities located in the contractual areas of Round 2.2. [50]

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[48] Universidad Autónoma Metropolitana, *Social Impact Evaluation Contract Area 11 Campo Malva*. Mexico, 2017. Available at: https://rondasmexico.gob.mx/media/4417/evis-r01l03-malva.pdf. Renaissance Oil Corp, S. A., de C. V., *Manifiesto* de *Impacto Ambiental Regional..., op. cit.*

[49] Ministry of Energy, *Technical Report: Social Impact Evaluation Contract Area 11 Campo Malva,* Mexico, SENER, Deputy General Directorate for Social Impact Evaluation and Prior Consultation, 2017. Available at: https://gtpdf.info/document/8cb055b/dictamen-t%C3%A9cnico-transparencia.

[50] Ministry of Energy, *Minutes of the work meeting between the SENER's Deputy General Directorate of Social Impact Evaluation and Prior Consultation, the General Secretariat of Government of the State of Chiapas and the municipal presidents of Francisco León, Tecpatán, Pichuchalco and Ixtacomitán of the State of Chiapas,* Tuxtla Gutiérrez, Chiapas, SENER, August 19, 2016. Available at:

4.3 Free, prior and informed consultation with communities and indigenous peoples

The binding legal framework for the right of indigenous peoples and communities to CPLI is found in Article 6 of Convention 169, which is reinforced by the content of Article 15 of the same instrument; Both precepts require the Mexican State to consult indigenous peoples and communities prior to granting concessions, permits, or any other act regarding property located in indigenous territories, in order to inform members of indigenous peoples and communities of the risks and implications of such actions, as well as measures to reduce or mitigate possible impacts and, if this is not possible, to proceed with compensation. In this process, the participation of these groups in the benefits derived from the proposed measure or project should be guaranteed, to the extent possible. [51]

With regard to the Campo Malva, SENER consulted the indigenous Zoque and Tsotsil communities in the municipalities of Pichucalco, Ixtacomitán, Tecpatán and Francisco de León, in the state of Chiapas. At that time, because there were no rules for consultation, SENER defined that the process should include the following phases: Consultation plan, previous agreements, informative, deliberative, consultative and agreement follow-up phase.[52] However, only the meetings held in some of Ixtacomitán's locations were documented and there is no access to information about the consultative and agreement follow-up phase. The following is a brief description of each of the phases:

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https://www.gob.mx/cms/uploads/attachment/file/199684/1__Minuta_de_trabajo_-_Tuxtla_Gutierrez_-_19_de_Agosto_de_2016.pdf.

[51] Anglés Hernández, Marisol y Basurto Gálvez, Patricia, "The right to consultation and free, prior and informed consent Algunas experiencias en México", in Argueta Villamar, A., Márquez, M. E. and Puchet Anyul, M. (Eds.), *Protección, desarrollo e innovación de conocimientos y recursos tradicionales,* México-CONACYT, 2018, pp. 110-111.

[52] Ministry of Energy, *Prior consultation with communities and indigenous peoples,* Mexico, SENER, 2018. Available at: https://www.gob.mx/cms/uploads/attachment/file/273192/consultaLibre2.pdf and Secretariat of Energy, Previous Consultation *on Exploration and Extraction Activities..., op. cit.*

- Consultation plan phase. This is the planning carried out by SENER to carry out the CPLI and the establishment of coordination mechanisms with the units and entities involved. In this case, planning was carried out with representatives of the federal government (SENER, Ministry of the Interior, Ministry of Agrarian, Territorial and Urban Development, National Commission for the Development of Indigenous Peoples, National Hydrocarbons Commission (CNH) and ASEA), as well as regional governments of the state of Chiapas and municipalities (Pichucalco, Ixtacomitán, Tecpatán, and Francisco de León) and, in some cases, ejido representatives (Ixtacomitán); however, the presence of representatives of indigenous communities was not documented. Authorities presented the benefits associated with the hydrocarbon exploration and extraction industry and considered the possible impacts on local water resources, while municipal and ejido authorities took advantage of the occasion to request the Chiapas state government to take the necessary steps to pave and repair roads and bridges, as well as improve health and education infrastructure. That is, the meeting was seen by the local representatives as an opportunity for participation to request what they considered to be lacking in the area, thus defeating the purpose of this phase. [53]
- Pre-agreement phase. This consists of the definitions that SENER and the traditional or representative authorities of the communities and indigenous peoples agree on the way in which CPLI will be carried out. In the case of the Campo Malva, the municipal and ejidal representatives, called "traditional representatives," intervened instead of accrediting the representation of the indigenous community. The document specifies that, through the traditional representatives, "*the* indigenous *community approves the consultation protocol and determines that the consultation procedure will be carried out under this instrument.* In another meeting in the same municipality of Ixtacomitán, the presence of 60 members of the Zoque community was documented, who were only spectators.
- Consultation protocol. By virtue of this protocol, the phases of the consultation, general details of the project, hydrocarbon exploration and extraction activities

[53] Secretaría de Energía, *Consulta Previa sobre las Actividades de Exploración y Extracción..., op. cit.*

and possible environmental and social impacts are explained. It is noteworthy that in this case the communities were provided with much information about the benefits of the project and very little about the negative impacts associated with it. The final protocol was elaborated by official actors together with local representatives (ejidales and municipalities, but not indigenous); which in origin vitiates and nullifies the objective of this process by leaving them out.

- Informative phase. This refers to the provision of sufficient and culturally relevant information to communities and indigenous peoples about the project being submitted to CPLI. Therefore, it is an opportunity for indigenous communities to request more information about the impacts they consider relevant. In the Campo Malva, they referred to direct impacts on the land (landslides), as well as implications of the temporary occupation of the land.
- Deliberative phase. This is the period of dialogue that occurs within the community or indigenous people for decision-making on the acceptance of the project submitted to CPLI. As a result of this process, three consultative assemblies were held, of which only the results from the community of La Candelaria, Ixtacomitán, were documented, in which "*conditional consent*" was given to: 1) not to carry out hydraulic fracturing activities "*fracking"*; 2) not to carry out activities in urban settlements and to respect 500m of distance from them, as a buffer area; 3) that the activities do not imply displacement and/or relocation of the community in question; 4) that any extra projected activity should be agreed upon in a Community Assembly; 5) the contractor must finance the paving of the specified roads; 6) the promoter must ensure the participation of the indigenous community in the EIA and EIS, as well as in the work plan; 7) the promoter must develop a local employment and training program; 8) a follow-up group made up of SENER and the indigenous community is agreed upon (Community Assembly Act). Finally, it was stipulated that the signing of official documents does not imply agreement or consent by either party.
- Consultative phase. It is for the construction of agreements or the obtaining of free and informed consent, as the case may be, on the development of the project submitted to CPLI. Unfortunately, documentation for this phase is not available for the project under study.

- Agreement Monitoring Phase. Its objective is to monitor compliance with the agreements adopted, using the mechanism that the community or indigenous people consulted have for this purpose. This phase was not achieved, because after the gradual decrease of meetings and participants in the phases of the CPLI process. After almost two months of meetings and disagreements with the communities, upon reaching this phase, the CNH informed that the contractual area of the Malva field would not be included in the bidding process, since the CPLI process had been extended and was not compatible with the bidding times. [54]

V. SWOT ANALYSIS OF PUBLIC PARTICIPATION IN ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENTS AND FREE PRIOR CONSULTATION AND INFORM

Although the EIA, EIS, and CPLI processes represent a great potential for public participation, various sources have pointed out their weaknesses in Mexico. For this reason,[55] a SWOT analysis of these participation processes was carried out, applied to the Campo Malva case (see table 1), as well as the legal framework for public participation in these processes (see table 2 for a summary).

[54] Oil & Gas Magazine, "SENER extends consultation process... *op. cit.,* p. 1.

[55] Centro Mexicano de Derecho Ambiental, Modificaciones al Procedimiento ..., *op. cit;* Gartman, Victoria et al., "Wind of Change or Wind of Challenges: Implementation Factors Regarding Wind Energy Development, an International Perspective", *AIMS Energy,* Vol. 2, núm. 4, 2014, pp. 485-504; Huesca-Pérez, María Elena, Sheinbaum-Pardo, Claudia y Köppel, Johann, "Social Implications of Siting Wind Energy in a Disadvantaged Region - The Case of the Isthmus of Tehuantepec, Mexico", Renewable and Sustainable Energy Reviews, Vol. 58, May, 2016, pp: 952-965; Palerm, Juan y Aceves, Carla, "Environmental Impact Assessment in Mexico: An Analysis from a 'Consolidating Democracy' Perspective", *Impact Assessment and Project Appraisal*, Vol. 22, núm. 2, June, 2004, pp. 99-108.

Table 1. SWOT Analysis Matrix for Participatory Pathways in EIA, EIS and CPLI Procedures		
	(+) STRENGTHS	(-) WEAKNESSES
Internal factors	• Regulation of the public consultation procedure in the EIA • Regulation of consultation and free, prior, and informed consent in Convention 169 to which the Mexican State is a party. • SENER's recognition of the importance of the social aspects of the projects, as well as the CPLI • Integration of SIA and CPLI in the legal framework of the hydrocarbon sector. • CPLI proved to be the only mechanism for public participation in the project.	• Differences in the EIA procedures of environmental projects of federal competence and of the hydrocarbons sector; which are in charge of diverse authorities, in the first case, corresponds to SEMARNAT and in the second case to ASEA. • Administrative discretion on the decision to carry out the public consultation on environmental matters. • Obsolescence of the LGEEPA and its regulations regarding participatory processes in the EIA, which shows a gap in the guarantee of human rights. • The outcome of the SIA does not determine the viability of the project. • Conflict of interest in the authorities involved in the participatory processes (they act as "judge and party") The SENER in the EIS and the ASEA in the EIA. • CPLI's vertical (commanded) and *ad hoc* design • Deviation from the purposes of CPLI to ask the government for local infrastructure (which it must pay for in other ways). • EIA and CPLI are used to legitimize non-binding participatory processes.

		• In the SIA, it is left to the person conducting the study to identify the indigenous communities in order to determine whether or not the CPLI has been established.
	(+) OPPORTUNITIES	(-) THREATS
External factors	• There are positive social impacts of the projects that can be enhanced and generate synergies, in this case, job creation and training. • Contribution of the SIA to manage conflicts. • Community assemblies as a way to exercise democratic public participation. • Need to update the public participation process in EIA to the human rights' legal framework. • Contributions of traditional knowledge in the mitigation and compensation measures of the EIA and in the Social Management Plan of the SIA. • Integration of the CPLI and the consultation and public (EIA) to the EIS	• Social impacts cover a spectrum that is very difficult to evaluate (autonomy, self-determination, development, territory, land tenure, etc.). • CPLI presents many variables that are very complex to solve. • The CPLI could be used as a mechanism to make projects viable, in exchange for small support to indigenous communities; undermining their purpose.

Source: Own elaboration.

VI. DISCUSSION AND RECOMMENDATIONS

The analysis of the public participation of the EIA, EIS, and CPLI, as well as the Mexican legal system with respect to our case study, identifies the following strengths (S), opportunities (O), weaknesses (W), and threats (T):

In regard to public participation in the legal framework, several limitations were identified. On the one hand, participation in the EIA process is not mandatory by law (W), so it should be considered a reform that is binding on the environmental authority (O); the CPLI is not part of the public consultation on environmental matters, which, moreover, the environmental authority can carry out at its discretion (W). On the other hand, the integration of the CPLI and the SIA into the Mexican legal framework recognizes the importance of the social aspects of hydrocarbon and electricity generation projects, as well as of consulting indigenous communities (S). The Mexican State has the obligation to guarantee the accomplishment of the CPLI, as part of the ratification of Convention 169 (S).

CPLI is a very complex aspect to manage and with many conceptual variables (T). The meetings of the different phases of the case study consultation were an opportunity for the indigenous communities to express themselves, and to request infrastructure works from the regional and local governments (W), which should be carried out in another context; this could be used as a mechanism to make the project viable in exchange for small support, perpetuating the impoverishment of the indigenous communities (T). Paradoxically, CPLI turned out to be the only mechanism for public participation in the project (S). However, the consultation has an imposed vertical, *ad hoc* design that restricts the true participation of indigenous communities, which are consulted in the last phase with a protocol already outlined by the authorities (W), thus perpetuating submission and simulating a democratic decision.

With regard to SIA, although it could substantially contribute to conflict management (O), it is carried out in a very generalized way, lacks significant public participation, and therefore risks being only a bureaucratic procedure, instead of an evaluation process (W). With respect to hydrocarbons, a special agency -the ASEA- was created to rule on environmental impacts, a situation that was not necessary, since SEMARNAT already existed as the head of the environmental sector for the determination of such impacts (W). The conflict of interest of the authorities involved in the participatory processes is evident, since they act as "judge and party". The SENER in the EIS and the ASEA in the EIA (W). In the SIA, the identification of

indigenous communities is in the hands of those carrying out the study to determine whether or not the CPLI has been carried out (W). Finally, the result of the SIA is not a determining factor for SENER to make the approval of a project viable or to stop it (W); therefore, it is not binding.

Social impacts cover a wide spectrum of assessment that is very difficult to address, in the case study, for example, land tenure, autonomy and social management (T). There are positive social impacts of the project, identified by the communities, such as local job creation and training (O). However, many of the social impacts are negative and SIA could have a beneficial effect in a conflict situation when it is supported by a high degree of public participation, as effective negotiation and solutions are more likely when there is greater public involvement. [56]

Finally, some considerable opportunities were identified to enhance the practice of EIA and EIS in our case study. Community assemblies are a notable example of the democratic exercise of public participation (O). Traditionally, community assemblies have been the basis for collective decisions in Indigenous communities, the distribution of work, and even the filling of representatives within the community. [57]It would be valuable to consider possible contributions of traditional knowledge to baselines, both environmental (EIA) and social one (SIA) (O). Indigenous communities identify and have a strong link to their tangible (archaeological sites, natural resources) and intangible (language, music, traditions) culture and this should be considered and protected in the planning of a project. Therefore, the [58]integration of community perceptions and traditional knowledge could enrich mitigation and compensation

[56] Prenzel, Paula V. y Vanclay, Frank, "How Social Impact Assessment Can Contribute to Conflict Management", *Environmental Impact Assessment Review,* Vol. 45, 2014, pp. 33-34.

[57] Gallardo García, Enrique, "Lo público en los procesos comunitarios de los pueblos indígenas en México," *Polis,* no. 31, 2012, p. 8.

[58] Smyth, Eddie y Vanclay, Frank, "The Social Framework for Projects: A Conceptual but Practical Model to Assist in Assessing, Planning and Managing the Social Impacts of Projects", *Impact Assessment and Project Appraisal*, Vol. 35, núm. 1, 2017, pp. 74-76.

measures. [59]In particular, we highlight the relevance of integrating public consultation and CPLI in the SIA process (O); under the following argumentation:

It is absolutely necessary to encourage public participation in the EIA process, public consultation (and public information hearing) should be mandatory by law in any project regulated by this procedure. The Mexican State's obligation to guarantee the right to indigenous participation in development projects that could affect them, as well as in other legal and administrative matters, is unavoidable. This is a result of the ratification of Convention 169[60] and the recognition of the autonomy and self-determination of indigenous peoples through the 2001 reforms to Article 2 of the Mexican Constitution.[61] Thus, the SIA could be enriched by including the CPLI (and public consultation) within its implementation process. This integration of processes would facilitate the development of the project itself.

In June 2018, following our case study, the Agreement for General Administrative Provisions on Social Impact Assessment in the Energy Sector was published, which emphasizes that the SIA should be carried out with a broad participatory approach. It calls for considering the point of view of communities in the identification, characterization, prediction and assessment of possible social impacts, as well as measures to mitigate, prevent and enhance them. In addition to mechanisms for active participation in the Social Management Plan. [62]The performance of these provisions in future SIAs is pending in the short and long term.

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[59] Nzeadibe, Thaddeus Chidi *et al.,* "Integrating Community Perceptions and Cultural Diversity in Social Impact Assessment in Nigeria", *Environmental Impact Assessment Review,* Vol. 55, 2015, p. 82; Glasson, John, "The Importance of Cultural Aspects in Impact Assessment and Project Development: Reflections from a Case Study of a Hydroelectric Dam in Brazil", *Impact Assessment and Project Appraisal,* Vol. 34, núm. 4, 2016, p. 307.

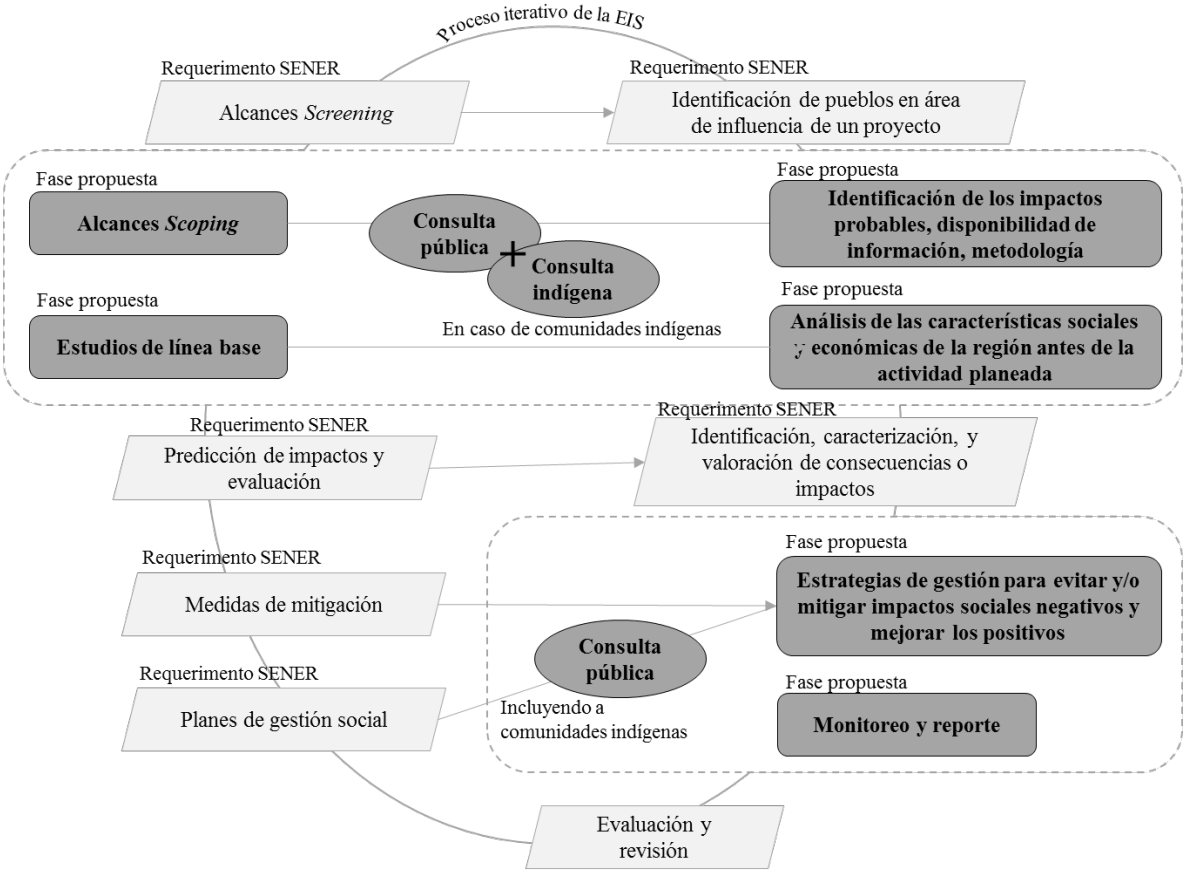
[60] International Labour Organization, *Indigenous and Tribal Peoples' Rights in Practice: A Guide to ILO Convention No. 169,* Geneva, ILO, 2019, pp. 59-77.

[61] Navarrete Linares, Federico, *Los Pueblos Indígenas de México,* Mexico, National Commission for the Development of Indigenous Peoples, 2008, p. 134.

[62] , México, Diario Oficial de la Federación, 1 de junio de 2018.Secretariat of Energy, *Agreement for the issuance of General Administrative Provisions on the*

Given that the phases of the environmental and social impact assessment process are methodologically very similar, [63]we present the legal process of the SIA, which is the responsibility of the SENER, with the proposal of incorporating public participation (public consultation and CPLI), (see figure 2). This model of an iterative process points out the requirements from SENER and indicates the proposed phases integrating both the public consultation and the CPLI in the process, specifically at the beginning of the process, in the Scope phase (identification of probable impacts) and in the Social Management Plan phase (as indicated by the new legal provisions for SIA).

Figure 2. Current SIA process with proposed phases.



Evaluation of Social Impact on the Energy Sector, México, Diario Oficial de la Federación, 1 de junio de 2018.

[63] IFC, *A Guide to Biodiversity for the Private Sector,* Washington, D. C., International Finance Corporation, 2012. Disponible en: https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/publications/biodiversityguide; Noble, Bram F., *Introduction to Environmental... op, cit.,* p. 17.

Source: Own elaboration adapted by International Finance Corporation, *A Guide to Biodiversity for the Private Sector,* Washington, D. C., IFC, 2012.

An important point of discussion is that the integration of CPLI into the SIA process should not be seen as complex. Managed in an organized and appropriate way to the circumstances, in a process close to the SIA and not isolated as it has been until now, we consider that there is great potential for optimization of both processes, and it could contribute to the materialization of the guarantee of human rights and good governance.

Public participation is considered a key element in the EIA and EIS. Given the nature and scope of the projects that are submitted to EIA, the process should involve public participation in almost all its phases; from *Screening* to implementation and monitoring. [64]Public participation has been recognized as an essential factor in the practice of EIA and is now mandatory in most environmental permitting systems worldwide.[65] Likewise, public participation should be an integral part of the EIS and should be initiated from the early stages of the process. [66]Good SIA practice involves a participatory process and understanding of local communities, which facilitates the agreement process and ensures, above all, the participation of vulnerable communities[67], including indigenous ones. Table 2 summarizes the purposes of public participation in each of the phases of EIA, as applicable to SIA.

Table 2. Objectives of public participation in the EIA process. [68]	
Objectives of public participation in the different phases of the EIA and EIS	
Initial project design	• Early identification of interests and values with respect to the project location
Screening	• Early notification to interested parties.
Scoping	• Identification of the public (active and inactive)

[64] Noble, Bram F., *Introduction to Environmental... op, cit.* , p. 217.

[65] *Ditto.*

[66] Barrow, C. J., *Social Impact Assessment: An Introduction*, London, Arnold, 2000, p. 54.

[67] Esteves, A. M., Franks, D. y Vanclay, F., "Social Impact Assessment: The State of the Art", *Impact Assessment and Project Appraisal,* Vol. 30, núm. 1, 2012, pp. 34-42.

[68] Noble, Bram F., *Introduction to Environmental... op, cit.* , p. 217.

	• Contribution of local knowledge for baseline studies. • Identification of possible significant impacts. • Identification of alternatives. • Establish contact and trust between proponent and public.
Prediction and evaluation of impacts	• Obtaining values and knowledge to assist in predicting impacts. • Identification of criteria to evaluate impacts.
Reporting and Reviewing	• Informing the public of project details, conditions, impacts and management measures. • Obtaining feedback from the public and identifying errors or omissions
Decision making	• Approach to the resolution of possible conflicts. • Integration of conditions (mitigation and compensation measures) and approvals into the document.
Follow up	• Maintain trust and credibility. • Identification of management effectiveness. • Monitoring of environmental changes.

Source: Own elaboration.

VII. CONCLUSIONS

The single case study of Campo Malva made evident the lack of significant public participation, both in the EIA and the SIA and even in the CPLI. The EIA regulations provide for public consultation without a special procedure in case the project affects indigenous communities. The EIS regulations, as such, did not contemplated significant public participation or citizen input into the EIS process until June 2018 with the publication of the Administrative Provisions on the Conduct of the EIS. However, if indigenous communities are identified, it is limited to recommending a CPLI. The result of these new provisions will be announced in the next SIA.

We identified some opportunities for improvement of the EIA and SIA process in a significantly participatory process. Ejido assemblies represent a model of democratic exercise and public participation in Mexico. Likewise, the traditional knowledge of communities could generate important inputs for both the EIA and the SIA; from the identification of impacts to the selection of mitigation and compensation measures.

SENER's procedures for carrying out a SIA and, where appropriate, CPLI lack a focus on meaningful participation in general and, in particular, on indigenous communities. Although it is interesting to note that CPLI turned out to be the only public participation mechanism in our case study. The fact that it has isolated procedures for public participation, in addition to lacking binding force, makes public participation even

more complicated. A clear institutional commitment is needed to move from a mere legal requirement to the accomplishment of public participation.

The current performance of the EIA and SIA could be improved in a relevant way, if a methodologically adequate process is carried out that includes the participation of the interested public -including indigenous communities-, not only to legitimize institutional processes, but also to involve people in the definition and/or redefinition of the very development of the project or activity in question. Therefore, we recommend an iterative process model for EIA and SIA with the relevance of integrating public consultation and CPLI into the SIA, as well as clarifying the objectives of including public participation in each of the phases of both the EIA and the SIA.

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