

Developing Evaluation Criteria for SIA Reports: Application on Geothermal Project Studies from Ethiopia, Indonesia and Kenya

Prepared by:
Nadine Naguib Suliman
PhD Student

Department of Resource Economics and Environmental Sociology
University of Alberta

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Abstract

Renewable energy sources have been under major scrutiny relative to public social acceptance. Although, theoretically and technically, renewables provide a more sustainable alternative to fossil fuels, uncertainty remains amongst the public as different innovations are developed. The aim of this paper is to investigate the emergence of geothermal energy projects and the associated community impacts through looking at environmental and social impact assessment (ESIA) reports; particularly the social aspects. First, I investigate social impact indicators drawing on the literature, then use these indicators to outline the main factors. Based on this, evaluation criteria from the ESIA literature is developed; criteria that included 8 detailed and exhaustive questions which ensure comprehensive analysis of the complex social dynamics within a community relative to energy and in particular renewable energy, community needs, views and perceptions, gender dynamics, etc. in a participatory manner. The criteria were built around the following major factors: stakeholders' identification, local community needs and interests, community participation and engagement, cultural context, institutional set-up, capacity building and mitigation, evaluation and monitoring plans. This was then applied to three case studies of geothermal power plant projects from Ethiopia, Indonesia, and Kenya. Through a comparative analysis of the social component of ESIA studies for these projects, it was found that these studies remain a standard operating procedure rather than an effectual, beneficial investigation. The projects chosen were from different parts of the world as a way to identify differences in conducting social analyses, however, all reports showed similar methodologies regardless of the location. It is worth noting that access to information was a limiting factor that made the analysis more challenging. Overall, a transformation in ESIA study methodologies is required through collaborations between practitioners and researchers to ensure the effectiveness of ESIA as a tool mediating between communities and technological innovations and not just a regulatory requirement.

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Introduction

Renewable energy sources have been under major scrutiny relative to public social acceptance (Gaede & Rowlands, 2018). Although, theoretically and technically, renewables provide a more sustainable alternative to fossil fuels, uncertainty remains amongst the public as different innovations are developed. The term social acceptance is prominent throughout research articles on renewable energy projects and has been described to entail three subdivisions: market, sociopolitical and community acceptance (Friedl & Reichl, 2015). The main dimension of social acceptance and arguably the most critical remains the community acceptance. Potential reasons for its importance may be the fact that it is embedded at many levels of society and includes the majority of the population as opposed to market and sociopolitical dimensions where decisions are made at higher levels by a few stakeholders with specific motives (ibid). Based on concepts of cost-benefit analysis, in theory, communities have the power to reject renewable energy projects if projects are found to have more disadvantages than advantages to the members of the community overall. Overall, newer developments, especially renewable energy projects, have been lacking efficient social acceptance. One such renewable energy endeavor requiring social acceptance prior to its large-scale development is geothermal energy. Hawaii as a case study can be seen as the most prominent example of the importance of social acceptance to geothermal energy (or any renewable energy project). Cultural views, values and beliefs of Hawaiian natives led to major upheaval against geothermal energy development on the islands where natural resources are considered sacred (see Edelstein & Kleese, 1995)

The aim of this paper is to investigate the emergence of geothermal energy projects and the associated community impacts. Developing evaluation criteria from the social impact assessment literature, I apply it to three ESIA reports of geothermal powerplant projects from Ethiopia, Indonesia, and Kenya. The evaluation criteria attempt to outline an exhaustive list of minimum requirements for social impact assessment studies that ensure comprehensive analysis of the complex social dynamics within a community, community needs, views and perceptions, gender dynamics, etc. in a participatory manner.

Geothermal technology

Geothermal energy is considered a growing source of energy within the renewables field and plays an essential role in global carbon reduction goals and commitments (Ellabban, Abu-Rub, & Blaabjerg, 2014; Lund, Bertani, & Boyd, 2015; Matek, 2016). The emergence of geothermal energy across the globe can be linked to the myriad of advantages it offers. Geothermal energy, when transformed into electrical power can reach higher efficiency levels compared to other renewables such as photovoltaic solar energy and/ or wind energy (Hydro-Québec, n.d.; Lund et al., 2015). Lund, Bertani and Boyd (2015) provide a detailed report on the worldwide application of geothermal up to the year 2015; including progress in different countries comparatively and attempts to quantify savings in fossil fuels as a result of transferring dependence to geothermal energy.

Geothermal energy application can be either direct use of heat, production of electricity through power plants or combined heat and power (Ellabban et al., 2014). Direct utilization of geothermal

energy was seen in 65 countries by 2015. The following figure (figure 1) is an overview of the worldwide installed geothermal energy capacity. In addition to existing geothermal power plants, planned developments in 2016 spanned 82 countries, roughly comprising 6-7% of the global potential.

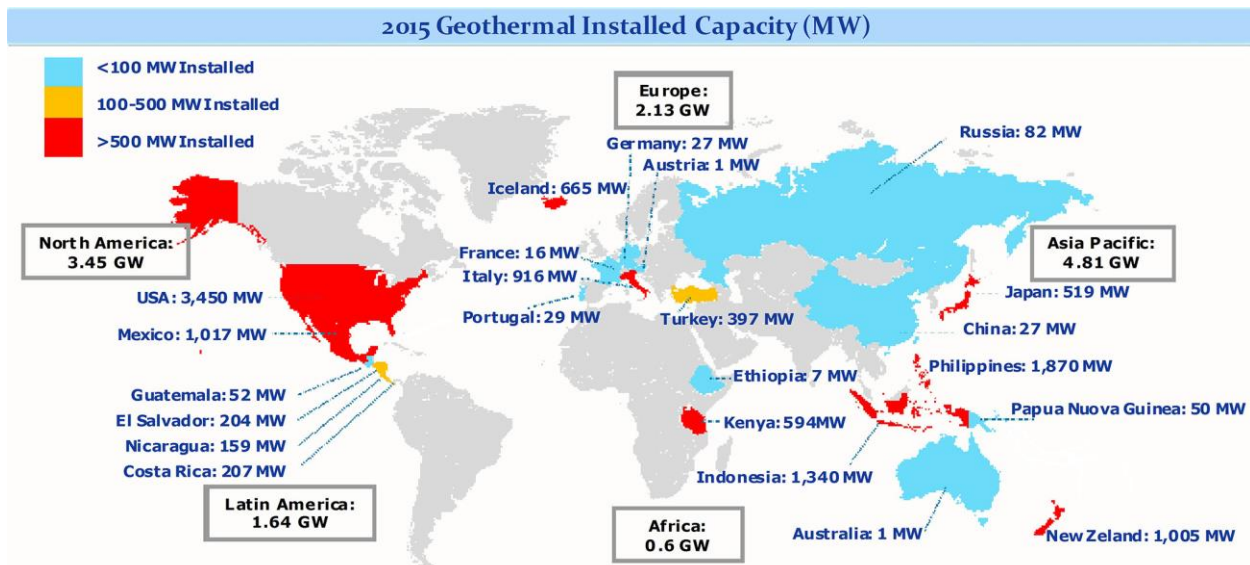


Figure 1 Worldwide mapping of geothermal energy installed capacity, image extracted from Lund et al. (2015) p. 82

While direct utilization and electricity production from geothermal energy offer a clean, unlimited supply of energy, the main disadvantage is the expensive start-up/ development costs as well as its high maintenance costs due to corrosion (Ellabban et al., 2014). Negative impacts of geothermal energy on the environment also include subsidence, changes in landscape, weather and social/ cultural impacts (ibid). Challenges to full adoption of geothermal power persist, in particular when compared to cheaper alternatives such as fossil fuels (Ellabban et al., 2014; Matek, 2016). Additionally, policies and legislations in many countries around the world remain favorable to fossil fuels largely due to the heavy reliance on them and the need for a reliable, well established source of power. Policy limitations, social and cultural impacts/ perceptions have been shown to slow down geothermal energy development in several countries including Canada (Bertani, 2016).

Environmental and Social Impact Assessment

Financial challenges to adopting geothermal energy on a large scale are common with most, if not all newer technological advancements. However, social and cultural impacts and their limitations may pose a greater challenge due to their interlinked complexities (Romanach, Carr-Cornish, & Muriuki, 2014). Development interventions over the past fifty years or more have been accompanied with a regulatory assessment procedure aiming to identify their impacts including advantages and disadvantages within their geographical location (Becker, 1997; Burdge, 1987; Burdge & Vanclay, 1996; Dendena & Corsi, 2015; Vanclay, 2003). This assessment procedure was limited in its scope to consider what is referred to by regulators and policy makers as “environmental impacts”, bypassing

scientific research into what such impacts should entail and more importantly, overlooking what is now referred to as “social impacts” – including social acceptance by local communities. Additionally, the EIA process (Environmental Impact Assessment) was applied to all countries alike, leaving minimal space for contextualization across diverse communities/ parts of the world (Burdge & Vanclay, 1996; Dendena & Corsi, 2015; Vanclay, 2003). After receiving a myriad of well-deserved critiques, a component titled “social impact” was developed within the EIA process and was planned to encompass all social implications to any project intervention (Arce-Gomez, Donovan, & Bedggood, 2015). Referred to as the SIA (Social Impact Assessment), this component had a limited scope and remained a minor constituent buried within EIAs (Becker, 1997; Burdge & Vanclay, 1996; Dendena & Corsi, 2015; Vanclay, 2003). However, much pressure was exerted internationally to allow for a revised definition, process, guidelines and regulations addressing regulatory, historical, cultural, and religious differences across communities/ countries as well as heritage, local knowledge and local social and economic priorities (Vanclay, 2003).

As a consequence of the advancements in impact assessment procedures, the social component became mandatory with the development of the ESIA process (Environmental and Social Impact Assessment); in the hopes for an integrated process that assigns appropriate weight and value to both components and what they entail (Arce-Gomez et al., 2015; Dendena & Corsi, 2015; Becker & Vanclay, 2003). However, many limitations of the SIA process prevailed due to its close link to regulatory bodies and their systematic nature (Arce-Gomez et al., 2015; Becker & Vanclay, 2003; Vanclay, 2003).

One common definition of SIAs within academia and elsewhere is “... *the process of identifying the future consequences of a current or proposed action which are related to individuals, organizations and social macro-systems.*” (Becker, 1997, p. 2). The main purpose of SIAs in this light is to “*ensure that the developments (or planned interventions) that do occur maximize the benefits and minimize the costs of those developments, especially those costs borne by the community.*” (Becker & Vanclay, 2003, p. 1). This definition has been widely contested as it is increasingly vague. The definition does not specify the nature of “benefits”, who the main beneficiaries should be, the type of costs which may be incurred. These uncertainties prevent SIA studies from attaining real, measurable and quantifiable results that can be included in decision-making processes (Becker & Vanclay, 2003). Hence, SIA studies are not regarded as valuable/ necessary except for operational purposes.

The problem with the systemization of SIAs is the reduction of their efficacy to a “*standard operation procedure*” where context-specific needs, priorities and values are not addressed. Additionally, SIAs are still optional in many projects. Limitations in application and use of SIAs were met by researchers with revised definitions and enhanced conceptualization of the process (Becker & Vanclay, 2003; Burdge, 1987; Burdge & Vanclay, 1996). Considering the difficulties of developing guidelines/ principles, several researchers have attempted to develop a framework that would ensure the efficiency and effectiveness of SIAs. Adding to its perceived importance to practitioners and regulators, the option for conducting a standalone SIA should become a viable key element in most, if not all,

processes of project development around the world (Arce-Gomez et al., 2015). According to Vanclay (2003, p. 5), any attempts to devise a guiding framework could have the potential to:

- “Assist in the development of legislation and policy at the national level;
- Provide standards for SIA practice in international contexts (transboundary projects, development cooperation, foreign investments, international banking);
- Increase the appeal of SIA to a wider range of audiences, through increasing its legitimacy/standing;
- Establish minimum standards for SIA practice;
- Provide an articulation of best practice in SIA as a model to aspire to;
- Remove confusion over terminology by establishing a definitive glossary;
- Establish the appropriate scope of the social component of impact assessments;
- Promote the integration of SIA in all impact assessments (especially environmental impact assessment and strategic environmental assessment).”

Theoretically, the abovementioned points indicate the importance of SIAs, if conducted properly, and their potential for supporting communities and several levels of governance towards more sustainable development activities (Arce-Gomez et al., 2015). Stressing on the theory component, many scholars emphasize the critical role of flexibility within SIAs in order to achieve the desired goals for projects worldwide. Yet, this emphasis has not been matched practically or methodologically (Arce-Gomez et al., 2015).

Aims of this study

This paper aims to identify a framework for evaluating SIA reports on geothermal projects that is based on best practice as identified in the scholarly literature. After establishing this framework, I then use it as a basis for evaluating several ESIA reports. Principles extracted from the literature, including those developed under the International Association for Impact Assessments (IAIA) (Vanclay, 2003), are described in detail and used to establish a criteria for assessing SIAs. It is worth noting that, for the purposes of this paper, SIA refers to the social component of ESIA reports and not necessarily standalone SIA documents, specifically for geothermal power plant projects. Upon establishing some criteria for effective SIAs based on the main principles and supporting guidelines published in the literature, a case study methodology is applied to three different SIAs for geothermal power plant projects from three countries in different parts of the world; namely Ethiopia, Indonesia and Kenya. Ideally, this will highlight any disparities between theory and practice while evaluating current SIA trends, if any, and reasons behind them.

Components of social impact assessment

One of the increasingly cited definitions of SIAs theoretically is based on Vanclay's work as published in the collaborative book titled "The international handbook of social impact assessment" and Vanclay's (2003) international principles of SIA report (Becker & Vanclay, 2003, p. 2) is as follows:

"SIA is the process of analyzing (predicting, evaluating and reflecting) and managing the intended and unintended consequences on the human environment of planned interventions (policies, programs, plans, projects) and any social change processes invoked by those interventions so as to bring about a more sustainable and equitable biophysical and human environment".

This definition is well rooted in social systems and offers a revised perspective that adds potential to discover "*unintended*" consequences of any planned action. Technically and theoretically speaking, in order to accurately apply the concept of this definition, one must examine local contexts in terms of social dynamics, and social systems in an attempt to evaluate the biophysical and human environment. This approach to SIA can be seen to exclude most universal SIA methodologies, such as a pre-defined list of indicators to measure social impacts. However, there are core values and principles to be considered prior to and regardless of the assessment of local contexts which will guarantee basic human rights, equity, transparency, preserving diversity, and ensuring interventions are mostly positive and overall accepted by local communities. (Becker & Vanclay, 2003).

The following table outlines some of the main considerations and guiding principles for the SIA process, its use and potential contribution to human development. Table 1 is intended to communicate comprehensive lists of the different dimensions of SIAs and is not meant to show correlation across the rows. The features, core values and principles mentioned are clearly more elaborative, inclusive and expansive relative to earlier definitions of SIA/ ESIA processes (Becker, 1997; Becker & Vanclay, 2003). Additionally, the lists emphasize the wide range of potential of SIAs which exceeds regulatory contexts. SIAs can act as tools to promote policies, integrate local knowledge, skills and experience with governance, utilize local capacities for community development, increase ownership, accountability and transparency between stakeholders and contribute to sustainable development (Becker & Vanclay, 2003; Wendell et al. , 1995).

Table 1 Comprehensive lists of different dimensions of the ‘social’ within the SIA process as devised by Vanclay (2003)¹

Features of SIA	Conceptualizing social changes	Core values of SIA	SIA practice principles
1. Impact assessments must have an ultimate goal of enhancing social, cultural, ecological, economic and political environments which maintain diversity while enhancing capacities, community development, social capital and overall empowerment of communities	1. Changes in people’s lifestyles including livelihood, social and recreational activities, and daily interactions	1. Maintaining/ enhancing basic human rights, regardless of gender, ethnicity, culture, background, age, etc.	1. Development planning and impact assessments should consider equity a fundamental premise and any interventions that infringe on human rights should be denied
2. SIAs should proactively assist in the conceptualization of development goals and improved outcomes through a collaborative process where community and stakeholder participation is essential for maximizing benefits prior to minimizing harm.	2. Changes in beliefs, values, traditions, language/ dialect; all which is encompassed by a community’s “culture”	2. Equity and equality in protecting and guarding human rights	2. Accepting that any intervention will have social impacts and those impacts extend to elements of community culture
3. SIA methodology should be highly versatile and flexible in order to maximize its application potential to a wide variety of large scale interventions that are not necessarily strictly regulatory.	3. Changes in the composition of the community in terms of cohesion, stability, character, services and facilities	3. People’s right to a good quality of life and their right to work and live in a healthy, safe and positive environment where they are able to utilize their full potential while constantly developing	3. Planned interventions are not set in stone and should have the flexibility for modification as suitable to eliminate negative impacts and increase positive ones
4. The element of participation with stakeholders should extend to adaptation of policies, plans,	4. Changes in a community’s political voice and ability to participate in the relevant	4. The right to a healthy social environment where fears are minimized,	4. SIA process should begin with the conceptual/ inception phases of

¹ Information contained in the table is extracted from Vanclay (2003) and modified to fit the table and capture the report’s main findings

<p>programs and projects alongside the important aspect of publicizing/ consulting on the planned design and operation measures.</p>	<p>decision-making process which may affect the overall democratic process</p>	<p>social relations are enhanced, and overall peace is maintained</p>	<p>development planning and continue along all other phases of scoping, implementation and operation</p>
<p>5. Local knowledge should be the foundation of SIA processes while enhancing participation of stakeholders during the assessment of social impacts, analysis of alternatives as well as the long-term monitoring procedures.</p>	<p>5. Changes in biophysical aspects of the environment such as air/ water quality as well as the control over and availability/ lack thereof resources or public services needed to maintain an equitable and safe standard of living</p>	<p>5. The right to have a say in the decision-making process within their community including any decisions that may affect their lives</p>	<p>5. SIA should guide development planning and contribute to situating best development practices and alternatives and should not only be seen as an evaluative tool</p>
<p>6. An increasingly important feature of SIAs is the acknowledgement of the high level of interrelatedness/ interconnectedness of social, economic, ecological and biophysical impacts; this points to the potential hardships of isolating any of them and the domino effect amongst them. Identified as “impact pathways” SIAs should always consider possible triggering events as an outcome of any and all changes.</p>	<p>6. Changes in physical, mental, social and or spiritual health and wellbeing, regardless of the existence/ absence of any ailments</p>	<p>6. The acknowledgement of the value of local knowledge and experience which may guide any planned interventions as appropriate to the local context</p>	<p>6. Social and human capital and democracy should all be fundamental components to enhance and build on during any planned development intervention and SIA implementation</p>
<p>7. Reflexivity must be highlighted within the field of SIA to ensure advancement and progress of the discipline in theoretical as well as practical terms over time (learning from the past and continuously updating with societal progress)</p>	<p>7. Changes in personal or property rights which may affect the economic status of an individual/ a group or violate their personal freedom in any form</p>		<p>7. Upon modification of intervention to minimize negative impacts, if impacts remain unavoidable, intervention alternatives should be considered and ways to turn impacted communities to beneficiaries must be explored</p>

<p>8. Having established a foundation of local knowledge, reflexivity, interconnectedness of impacts and stakeholder participation, SIAs have the potential to be applied to/ support other events of different natures such as disasters, epidemics, etc.</p>	<p>8. Changes in their perceptions, fears and aspirations regarding their future and the subsequent generations'.</p>	<p>8. Should impacted communities approve an intervention or not, mitigation measures should always be considered</p> <p>9. Assessments should always incorporate local knowledge and experience dependent on local culture and all it entails</p> <p>10. Violence, harassment, intimidation or undue force in connection with the assessment or implementation of a planned intervention should be avoided at all costs</p>
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Practical implementation of SIA

As discussed earlier, there are wide disparities between theory and implementation when it comes to ESIA's and specifically the social component (Aledo-Tur & Domínguez-Gomez, 2017; Dendena & Corsi, 2015). Practitioners, and in many cases, private consultants, are contracted for a limited amount of time to perform these impact assessments on behalf of the project owners and usually come from various disciplinary backgrounds; most of which are deeply technical (Aledo-Tur & Domínguez-Gomez, 2017; Taylor, Goodrich, & Bryan, 1990; Wong & Ho, 2015). While the multidisciplinary nature of SIA implementation adds to the diversity of knowledge production, it also contributes to the major issue associated with IAs which is embodied in their quality, efficiency and effectiveness relative to the purpose they supposedly serve (Burdge & Vanclay, 1996; Wong & Ho, 2015). Pertaining to SIAs in particular, and due to the potential subjectivity of what's defined as a social impact, lists of indicators have been developed. These lists which initiated as general categories of potential social impacts such as health/ biophysical impacts, impacts on public and private sectors, impacts on cultural systems, etc. have been constantly enhanced to provide a more comprehensive outlook (Vanclay, 2002). Ideally, these detailed social impacts indicator lists can be regarded to fulfill two purposes, one is to act as a guideline to conducting SIAs and the second is a possible evaluation tool of the quality of an SIA. The following section highlights some of the main published social impact indicator lists and their applicability in theory but more so in practice.

Vanclay (2002) provides comprehensive data on social impact indicators published by different authors/ authorities. He outlines the progress of these indicator lists and the timeline through which these lists become more specific and detailed. The following table (Table 2) is included in his paper and contrasts two of the more inclusive indicator lists; the list issued by the Interorganizational Committee on Guidelines and Principles for Social Impact Assessment (1994) and that issued by Burdge (1994) (Vanclay, 2002, p. 187). The two lists have several similarities in terms of the general categorical classification and the detailed social impact indicators. Overall, both lists provide an overview of potential social changes which are mostly quantifiable such as the influx of workers, changes in job markets, or infrastructure. Qualitative data sources or social impacts that may be based on individual/ group/ community experiences are limited. While social impacts are constantly defined as context dependent, highly discursive social changes, these lists demonstrate persistent discrepancies between this definition and its application.

Table 2 Comparison between two lists of social impact indicators as extracted from Vanclay (2002)

Interorganizational Committee	Burdge's List of 26
<p>Population characteristics</p> <ol style="list-style-type: none"> 1. Present population and expected change 2. Ethnic and racial diversity/distribution 3. Relocated populations 4. Influx or outflow of temporary workers 5. Seasonal residents 	<p>Population characteristics (demographic effects)</p> <ol style="list-style-type: none"> 1. Population change 2. Dissimilarity in age, gender, racial or ethnic composition (ethnic and racial distribution) 3. Relocated populations 4. Influx or outflow of temporary workers 5. seasonal (leisure) residents
<p>Community and institutional structures</p> <ol style="list-style-type: none"> 6. Voluntary associations 7. Interest group activity 8. Size and structure of local government 9. Historical experience with change 10. Employment/income characteristics 11. Employment equity of minority groups 12. Local/regional/national linkages 13. Industrial/commercial diversity 14. Presence of planning and zoning activity 	<p>Community and institutional structures (public involvement)</p> <ol style="list-style-type: none"> 6. Formation of attitudes towards the project (voluntary associations) 7. Interest group activity 8. Alteration in size and structure of local Government 9. Presence of planning and zoning activity 10. Industrial/commercial diversity 11. Enhanced economic inequities 12. Employment equity of minority groups 13. Changing occupational opportunities
<p>Political and social resources</p> <ol style="list-style-type: none"> 15. Distribution of power and authority 16. Identification of stakeholders 17. Interested and affected parties 18. Leadership capability and characteristics 	<p>Conflicts between local residents and newcomers</p> <ol style="list-style-type: none"> 14. Presence of an outside agency 15. Introduction of new social classes 16. Change in the commercial/industrial focus of the community 17. Presence of weekend residents (recreational)
<p>Individual and family changes</p> <ol style="list-style-type: none"> 19. Perceptions of risk, health, and safety 20. Displacement/relocation concerns (perceptions) 21. Trust in political and social institutions 22. Residential stability 23. Density of acquaintanceship 24. Attitude toward policy/project 25. Family and friendship networks 26. Concerns about social well-being 	<p>Individual and family changes (cultural effects)</p> <ol style="list-style-type: none"> 18. Disruption in daily living and movement patterns 19. Dissimilarities in religious practices 20. Alteration in family structure 21. Disruption of social networks 22. Perceptions about public health and safety 23. Change in leisure opportunities
<p>Community resources</p> <ol style="list-style-type: none"> 27. Change in community infrastructure 28. Native American tribes 29. Land use patterns 30. Effects on cultural, historical, and archaeological resources 	<p>Community resources (infrastructure needs)</p> <ol style="list-style-type: none"> 24. Change in community infrastructure 25. land acquisition and disposal 26. Effects on known cultural, historical and archaeological resources

It is argued that social changes do not necessarily translate to social impacts, especially if well managed (Vanclay, 2002). Moreover, these changes, even if identified as impacts, may be positive unlike the negative manner by which they are described in the previous table (Table 2). Clearly, identifying social impacts remains a challenging task due to their dualities of quantitative versus qualitative aspects and the societal/ contextual specificities (Vanclay, 2002). Critics of these social impact indicator lists have

noticed that some of them are not necessarily referring to a social impact, but are rather just lists of indicators “... *that should be considered in a study to provide information that could be used to determine social impacts that might exist in a particular community.*” (Vanclay, 2002, p. 188). In his paper, Vanclay (2002) describes several social change processes which may lead to social impacts yet he concurs that it is impossible to have an all inclusive list. He relates this finding to the constantly evolving world we live in and to everyday advances in sociotechnical developments.

There remains value in the information provided by such lists where they can direct researchers towards relevant areas of inquiry. For example, most of the categories mentioned above may be regarded as questions to be included in one of the most important aspects of SIAs, that is public participation and public engagement strategies. Largely, public participation events carried out by practitioners during the SIA process are limited in focus and effectiveness as they commonly encompass one way communication where information is delivered to the public with little or no regard to feedback/ input (Wong & Ho, 2015). Many of the aforementioned subjects such as cultural effects, community needs, social cohesion, etc. require a high level of interaction with the concerned parties/ stakeholders. Perhaps the assumption that the public participation component is encompassed in quantitatively collecting data points on the variables listed above and presenting it to the public as opposed to involving them in the data collection and inquiry methods is one of the main weaknesses repeatedly applied by SIA practitioners (Aledo-Tur & Domínguez-Gomez, 2017; Wendell et al., 1995; Wong & Ho, 2015). This is succinctly summarized in the following diagram by Taylor et al. (1990, p. 30) where approaches to conducting SIAs are differentiated by their level of community involvement (process oriented) as opposed to technocratic approaches (product oriented) and action versus research orientated processes.

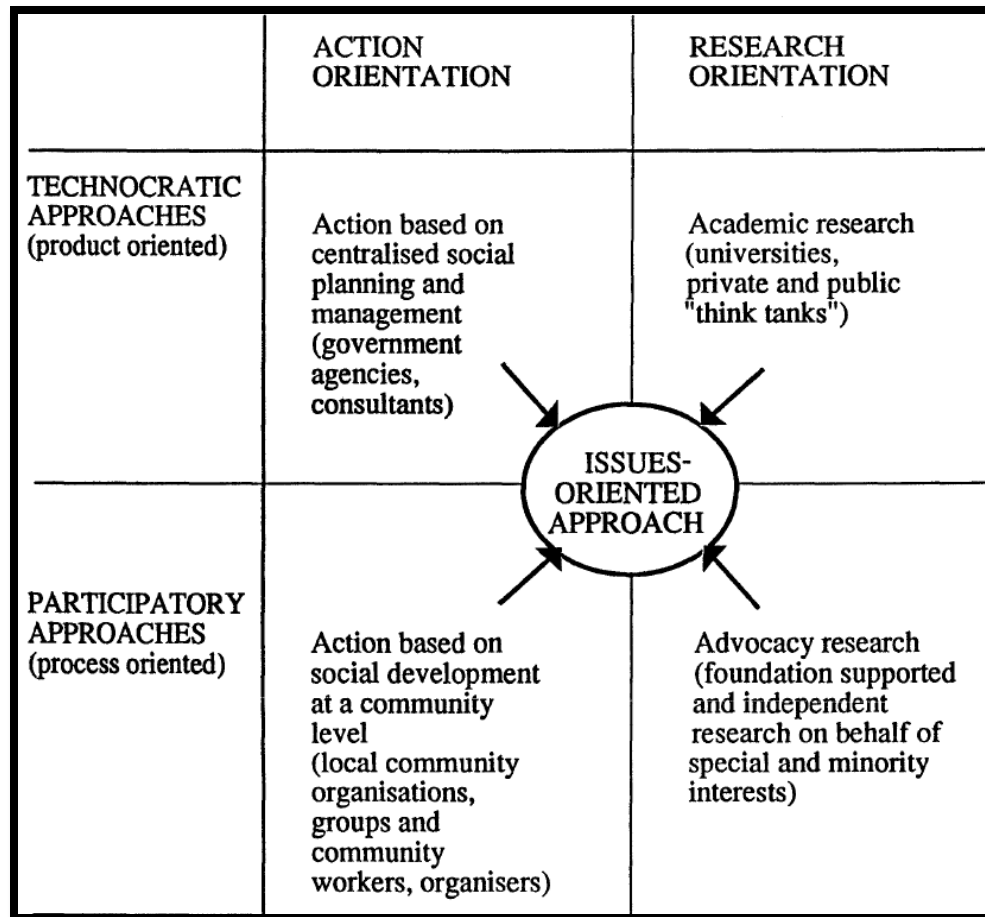


Figure 2 Diagram developed by Taylor et al. (1990) demonstrating different orientations to SIAs

Conducting SIAs requires practitioners to have flexibility, agility and reflexivity, as mentioned earlier. Combining several approaches (as seen in Figure 2) demonstrates a well-rounded process that reflects all the principles and serves all the purposes of SIAs. *Action oriented approaches*, also referred to as political approaches were found to address a large component of societal dynamics and instability and is largely inclusive of local knowledge and experience (Parkins and Mitchell, 2016). On the other hand, *research-oriented approaches*, also known as technical approaches, are more structural where a large focus is on quantifiable aspects and timelines (ibid). While there's much value in having clear, measurable outputs, this approach has been criticized for its lack of clarity and conceptual linkages necessary to guide the different variables and indicators of social impacts. It was found that applying participatory research along with action based participatory approaches while maintaining a product oriented mindset could result in an optimal method of conducting SIAs, which is referred to as "*issues-oriented approach*" (Aledo-Tur & Domínguez-Gomez, 2017; Taylor et al., 1990). Wong and Ho (2015) provide a comprehensive breakdown of the essential roles during an SIA as well as a step by step process to conducting the SIA "project". They refer to SIAs as 'projects' as they found that it enhances the quality as it relies on several project management basics. Taking a closer look at the breakdown of the roles they include, many of the conceptual ideas mentioned in figure 1 are practically reflected amongst

these roles. Starting with the role of ‘project manager’ who may possess a more technical perspective with a focus on quality and efficiency, to ‘social researcher’ who would be well grounded in theories revolving around SIAs and identifying impacts, to ‘community developer’ and ‘visionary’ whose main aims are to ensure the development intervention benefits the community and contributes to its flourishing, to ‘public involvement specialist’ and ‘educator’ who would be responsible for incorporating the voices of the public within all stages of planning, implementation and evaluation of the intervention as well as educating them on the purpose of SIAs and its values, principles and practices, these roles clearly bring in several intellectual perspectives that are complimentary in nature and align perfectly with the goals of SIA (Wong & Ho, 2015).

Linking public engagement with social impact assessment

Effective public engagement and involvement in the developing of an intervention as well as throughout conducting an SIA process is commonly seen as the missing link (Becker, Harris, McLaughlin, & Nielsen, 2003; Esteves, Franks, & Vanclay, 2012; Taylor et al., 1990; Webler Wendell et al., 1995; Wong & Ho, 2015). Many different participation strategies and techniques have been mentioned in the literature (e.g. Becker et al., 2003; Taylor et al., 1990), yet all insist on the importance of including local knowledge in the SIA process. A community based, consultative approach is one way to ensure stakeholder participation and can include different activities (Taylor et al., 1990; Webler Wendell et al., 1995). It is essential to note that these activities require a degree of education on the concept of SIA as well as on social change processes, as mentioned earlier, prior to any attempts to gather information or consensus on the planned intervention (Esteves et al., 2012; Taylor et al., 1990; Webler Wendell et al., 1995). Activities where such knowledge exchange and learning processes can occur include but are not limited to (Taylor et al., 1990; Wendell et al., 1995; Wong & Ho, 2015):

- Face to face interviews
- Planned community site visits
- Small group and large formal meetings
- Periodic planned follow up meetings
- Community advisory committees
- Community/ liaison forums
- Hotline to receive public input
- Information centers/ displays
- Surveys
- Workshops/ seminars
- Written material
- Radio communication
- Scenario assessments

All public participation activities conducted under the SIA process should be carried out in an organized, collaborative and planned manner. Activities should be part of an elaborate strategy that spans as much time as needed to ensure that all community members/ groups are heard and informed

including marginalized and vulnerable groups which are often left out, to allow for transparency and creating a safe environment for members to communicate both positive and negative input, to empower the local community and find ways to develop local capacities and social capital, and to promote equity (Wong & Ho, 2015). While one of the reasons behind public participation within the SIA process is to obtain social license and public validation, it should not be seen as the sole purpose of the activities listed above (Esteves et al., 2012; Wong & Ho, 2015).

The concept of “*meaningful participation*” which has been adopted by many development agencies such as the World Bank, has many interpretations but mainly encompasses the right to refuse/ reject a planned intervention, the right to be warned of potential risks to a community and offered means to mitigate those risks, and has been linked to the concept of Free Prior and Informed Consent (FPIC) (Esteves et al., 2012; Goodland, 2004; Indigenous Peoples and Minorities Section, 2013). The main understanding of FPIC is that it is a process where all relevant information to planned interventions is provided to the public and easily accessible at all time, enabling them to make well-informed decisions and consequently can be a tool for project developers to obtain a “*social license to operate*” (Goodland, 2004). Esteves et al (2012) discuss the importance of FPIC within the SIA process, however, they warn from the potential practical challenges of applying it, similar to the main challenges of SIAs. They list some of these challenges as follows:

- “... *defining who has the right to give consent and who represents the affected communities and therefore has a right to be compensated and/or to benefit;*
- *ensuring informed consent in contexts where traditional understandings differ from Western scientific understandings;*
- *deciding who has legitimacy as an information provider;*
- *the issue of veto and the potential undermining of state sovereignty and eminent domain;*
- *the right and/or ability of communities to withdraw consent at a later stage;*
- *implications for project costs and delay;*
- *addressing the power imbalances between affected peoples and developers;*
- *mechanisms for redress in the absence of FPIC.”* (Esteves et al., 2012, p. 37)

Incorporating all the factors listed above to fulfill the requirements of an effective SIA is not a simple task; it is rather challenging and complex, as is the case with social systems and social processes. Development interventions are yet to achieve the perfect formula where benefits are maximised and tailored to a community especially to the most vulnerable groups, all concerned parties are well informed and able to contribute to all project phases, and all risks are coupled with a strong mitigation and management plan that also involves public collaboration. Optimizing this process requires a lot of effort from practitioners, in addition to time, and resources to properly conduct all baseline studies and SIAs. As the main purpose of this paper is to assist in this process of optimizing SIA through the development of criteria for best practice and the evaluation of existing EIA reports, the following section poses some basic SIA requirements as a first step. These requirements are in the form of questions and will be used to assess the three case studies mentioned above.

Criteria for evaluating SIA studies²

Question 1: Are all stakeholders of the project/proposed action clearly identified?

Becker and Vanclay (2003) and Wendell et al. (1995), amongst others, discuss the importance of stakeholders within the SIA process and hence the main theme of most of the following questions revolves around stakeholders and their proper inclusion/ participation. This first question may seem rather simple as it revolves around identifying groups of people which will be impacted by the project whether directly or indirectly. Yet, it remains highly central to the SIA process and its efficiency. Stakeholders can be quite varied and usually have valuable input throughout all stages of project development as well as implementation (Becker & Vanclay, 2003; Friedl & Reichl, 2015; Wendell et al., 1995). Misidentification of stakeholders or leaving out any groups of people could cause disparities leading to unnecessary conflicts and potential complications. Sustainable development requires a high level of social cohesion and public participation in order to ensure benefits are maximised (Arce-Gomez et al., 2015).

Question 2: Are project objectives consistent with the needs, interests and capacity of community members and stakeholders including the most vulnerable/ most affected groups?

Similar to question 1, this question addresses stakeholders and their needs. Development projects, and those pertaining to renewable energy interventions must ensure community members and stakeholders understand the nature of the intervention, and all its potential impacts. More importantly, while it is scientifically, politically and economically established that communities all over the world are in dire need to diversify, or rather transform the sources of energy, there remains a social gap where the public is not fully aware of the situation (Cohen et al., 2014; Gaede & Rowlands, 2018). Hence, proper identification of stakeholders and their needs, is critical to project success and is a prerequisite of sustainable development overall (Wendell et al., 1995).

Question 3: Are all social and cultural factors which may affect the ability of stakeholders to participate or benefit from the proposed policy or project included in the report/ consultation process?

In order to properly evaluate a social impact assessment report and in addition to the above mentioned points, social and cultural factors pertaining to stakeholders need to be fully analysed and clearly communicated during the public and stakeholder consultation as well as the SIA report itself (Centre for Good Governance, 2006). There is much scrutiny when it comes to identifying and analysing social and cultural factors, however, as discussed earlier, combining different research methods, including all stakeholders at the various stages of project development, and conducting proper consultation activities reduces uncertainty and vagueness (Parkins & Mitchell, 2015; Taylor et al., 1990).

² These questions are modified version of those mentioned in the Comprehensive Guide for Social impact as published by the Centre for Good Governance (2006, p. 6) under the United Nations Public Administration Network and have been modified to include all the topics discussed in the literature/ in this paper.

Question 4: Has there been a thorough public participation process that includes at least 3 of the engagement activities mentioned earlier spanning all phases of project development and SIA process?

Although there is not a strict formula to how many engagement activities are required for an adequate assessment, it is logical to assume that the bigger the number and the more diverse the activities are, more information will be collected, allowing for more comprehensive results. Public participation can be lengthy and complex but it is critical for any SIAs, especially those for development projects (e.g. (Parkins & Mitchell, 2015; Webler Wendell et al., 1995).

Question 5: What institutional arrangements are needed for participation and project delivery?

This question resounds with the importance of prioritizing local contexts; including needs, challenges, capacities and so on. Participation, consultation and public involvement require strong institutional capacities in order to sufficiently accommodate all stakeholders (Centre for Good Governance, 2006). Accordingly, project owners and development agencies are required, as part of their intervention, to fill any gaps in their institutional arrangement to suit the local context (Vanclay, 2003; Wendell et al., 1995; Wong & Ho, 2015).

Question 6: Are there plans to build capacity at appropriate levels?

Gaps within institutions and capacities necessary for a successful planning process and an efficient SIA must be clearly addressed within the report. Development projects and specifically innovative and unorthodox interventions may require unconventional capacities at the local level in addition to external experts. Additionally, involving local stakeholders and community members through capacity building programs is an opportunity to enhance participation and social acceptance and ownership (Becker & Vanclay, 2003; Webler Wendell et al., 1995)

Question 7: Have the impacts of the project or program on the various stakeholders, especially women and vulnerable groups been identified and addressed?

This is an essential question as it addresses a certain level of specificity required upon identifying social impacts. Most ESIA and SIA only mention general “umbrella” impacts without linking them to certain stakeholder groups. Consequently, this creates a sense of detachment for stakeholders from the impact assessment as they have not been specifically heard/ addressed during project development (Centre for Good Governance, 2006).

Question 8: Are there plans to mitigate adverse impacts and has local knowledge been accounted for in the mitigation plans?

The importance of local knowledge cannot be reiterated enough as it is considered one of the determining factors of success of development interventions (Parkins & Mitchell, 2015; Vanclay, 2002). Although local knowledge is understudied due to the time, effort and resources required to properly interpret its various elements, it remains the foundation of SIA studies as mentioned earlier (Vanclay, 2003).

Analysis of ESIA reports for geothermal power plants

It is critical to consider the difficulty of satisfying all these questions within an SIA report noting the challenges mentioned above. Additionally, SIA procedures and regulations vary between countries and regions which may impose complications when comparing and contrasting the reports. Regardless, this paper represents a generalized example which aims to find structural foundations in the SIA process across different regions which can be easily identifiable and may act as a framework/skeleton for proper SIA reports and or social components within ESIA's. In addition, the analysis can be used as a template for evaluating SIA reports.

All ESIA reports used for this analysis were conducted for geothermal power plants in the following locations:

1- Ethiopia - Tulu Moya Geothermal Development Project (Phase 1 – 100 MW) (Magnusdottir, Thors, & Jonsson, 2017)

The Tulu Moya project is located along the Ethiopian Rift Valley which is said to have high geothermal resource potential; approximately 100 km southeast of Addis Ababa. The project has potential to reach up to 500 MW in production and this ESIA is for the 1st phase which includes exploration, drilling and development of a 100 MW power station. This is projected to have little or no impact on the geothermal resource. It is also part of the Ethiopian government's planned Economic Reform Program that focuses on renewable energy and will introduce a feed-in-tariff system. The consultant is committed to leading and supporting the government of Ethiopia in their planned development in accordance with national, federal and international laws and regulations. The main challenge to this project will be land expropriation, however, resettlement plans will be put in place to mitigate such an impact.

2- Indonesia - 250MW Rantau Dedap Geothermal Powerplant (Phase 1- 92MW) South Sumatra (ESC, 2012)

The powerplant is a project by a joint venture, the PT Supreme Energy Rantau Dedap. It is located across two regencies (Muara Enim and Lahat) and one city (Pagar Alam) in the province of South Sumatra which is 225 km from the capital city of the province (Palembang). This power plant is part of a larger project by the government of Indonesia to add 35,000 MW by 2025, 23% of which are expected to be from a renewable source and 80% of the renewables are planned to be based on geothermal resources. The first phase of the project to produce 92 MW power, based on the power purchase agreement with the country, will be using dual flash technology which is proven to have close to 100% reliability.

3- Kenya - Suswa Geothermal Development Project in Narok and Kajiado Counties (5000 MW) (Redplan Consultants Ltd, 2013)

The power plant is a project by the Geothermal Development Company (GDC) which was awarded a license by the Ministry of Energy to explore the Kajiado and Narok counties for

geothermal potential, as well as produce and convert steam into electricity and build a power plant. The agreement states that the GDC is to sell the produced electricity to Kenya Power Company. The report was conducted during the drilling and exploration phase, while preparing for the development phase as a requirement by local environmental acts and regulations. The project area is about 80 km from Nairobi and the expected structure will be 2100m in depth and the exploratory wells found temperatures ranging between “285 -300 °C with low resistivity of 10 -15 Ohm-m and heat losses >3000 MW at 1 m depth.” (Redplan Consultants Ltd, 2013, p. 5). The project, which is expected to be completed in 2030, will have a total of 1,130 wells needed to produce 5,000 MW. Energy produced is expected to be distributed on a national scale, yet the project description indicates certain economic benefits on a local scale for the residents of the project area.

The following table (Table 3) represents a comprehensive evaluation of all three ESIA reports highlighting the main aspects of the social components of the assessment according to the criteria outlined above. It is worth noting that, since these reports are ESIA as opposed to only SIAs, social impacts are minimally discussed and in various levels of detail across the three reports. However, and as mentioned earlier, ESIA reports must include a comprehensive social impact analysis with all its dimensions. This evaluation attempts to identify and analyse the quality of existing social elements and the missing ones. The evaluation results are shown in Table 3 and clearly address each question respective to the different ESIA studies.

Table 3 Analysis table comparing and contrasting social impact assessments from 3 ESIA studies from Ethiopia, Indonesia and Kenya

	<i>Ethiopia ESIA</i>	<i>Indonesia ESIA</i>	<i>Kenya ESIA</i>
Question 1: Are all stakeholders of the project/proposed action clearly identified?	Apart from the demographics of the area, there is no strict section that clearly identifies the different stakeholders. Local communities around the project area are included and government with all its relevant sectors are also highlighted.	The report outlines many of the stakeholders which are categorised and detailed in a table (ESC, 2012, pp. 136–137). Categories include affected communities, government/ regulatory authorities, NGOs, women and vulnerable groups, private businesses, mass media and other stakeholders, and educational institutions. Within the social management system, “stakeholder mapping, identification and analysis (influence and interest)...” is mentioned as the first bullet point (ESC, 2012, p. 17).	In the report, the following statement was found “ <i>There were no well-defined stakeholders groups.</i> ” (GDC, n.d., p. 19). However, the following groups were included in the baseline questionnaire which “ <i>...targeted residents around the geothermal concession area, and Kenya government officials drawn from relevant ministries and government energy agencies, NGOs, local communities, CBO’s, opinion leaders, faith-based organisations, human rights groups, and development organizations that have an interest in the Suswa area.</i> ” (GDC, n.d., p. 19). The social analysis conducted ensured different socio-economic groups are included, specifically the following factors guided the process: age group, gender, socioeconomic levels, occupation, location, clan, land ownership. Additionally, stakeholder involvement is mentioned throughout the report in

			different sections such as impact identification, mitigation plan and management and monitoring system.
<i>Question 2: Are project objectives consistent with the needs, interests and capacity of community members and stakeholders including the most vulnerable/ most affected groups?</i>	Project objectives are to exploit an indigenous, clean and sustainable source of energy to benefit local communities and divert the use of fossil fuels. The project also aims to transfer foreign expertise to the locals and strengthen local geothermal capacities for long term benefits. Particular needs and interests of community members and stakeholders are not addressed within the project objectives.	Project objectives are not strictly mentioned in the report. However, in the project description it is mentioned that the goal is to produce clean energy and contribute to minimizing green house gas emissions.	The main objective of the project directly mentioned in the report is the fact that it will be generating clean electricity for the area. Specifically, the report mentions the need to reduce reliance on imported fossil fuels, reduce green house gas emissions, increase energy efficiency and promote sustainable use of it. This is in addition to the objective to create and retain local employment opportunities. There is no mention of specific project objectives that address the needs/ interests/ capacities of community members and stakeholders.
<i>Question 3: Are all social and cultural factors which may affect the ability of stakeholders to participate or benefit from the proposed policy or project included in the report/</i>	ESIA team ensured inclusion of local community members from different sectors in order to be representative of all cultural views and socioeconomic factors pertaining to the project. While it is not strictly mentioned, this can be seen to improve the chances of stakeholders benefiting from/ participating in all project activities.	Stakeholders participation seems to have been highlighted during the project where “two-way” communication was promoted to ensure stakeholders’ views are heard and addressed. The several methods of stakeholder engagement used are an indication of project owners’ attempts to accommodate all groups within the community. All activities and the key	Cultural factors mentioned in the report include the potential loss of local Masai culture due to the increased exposure and globalization. Moreover, in order for the local community to benefit from positive impacts such as ecotourism, infrastructure in the nearby villages will need improvement. It is also mentioned that, when monitoring

<i>consultation process?</i>		issues raised are summarized in a table within the report (ESC, 2012, pp. 139–143).	social issues, participatory approaches are recommended to ensure ownership and planned benefits.
<i>Question 4: Has there been a thorough public participation process that includes at least 3 of the engagement activities mentioned earlier spanning all phases of project development and SIA process?</i>	The study included a stakeholder engagement plan which was not attached to the report. However, some of the public participation activities included focus group discussions, consultation meetings with vulnerable groups, individual interviews and household surveys which spanned all phases of project development and SIA process.	Stakeholder engagement activities commenced prior to the exploratory drilling began and were described as “sustained”. These activities included interviews, individual and group formal consultations and discussions as well as site visits with the local community to increase awareness of the project’s future. The report also stresses on project owner’s emphasis on stakeholder engagement throughout all phases; exploration, construction and operation.	Public participation has been conducted and results indicated initial acceptance of the project as well as preliminary benefits to community members such as improved access to water, better roads, more employment opportunities, etc. Participation activities included a kick off public information meeting, direct socio-economic surveys, consultative meetings from lead agencies and public meetings (see Table 2, GDC, n.d., p. 15) .This was in addition to questionnaires, focus group discussions and interviews prior to, during and after completion of the ESIA report.
<i>Question 5: What institutional arrangements are needed for participation and project delivery?</i>	Institutional training programs and the focus of project owners on transferring knowledge and building capacity on the local level can be considered a positive arrangement that would promote participation and facilitate project delivery.	The main action taken by project owners that may be considered an institutional arrangement is the Corporate Social Responsibility (CSR) program (ESC, 2012, p. 151). The CSR program does not strictly facilitate participation and delivery of project; however, it indirectly strengthens local	Some institutional arrangements were planned to be put in place to assist in project delivery and meeting all objectives. These include proper record keeping to track benefits to the local economy such as recording the number of contracts awarded to local

		capacities to do so. Through enhancing healthcare systems, empowering the local economy, improving basic infrastructure and strengthening community relations they build strong relationships with the public, gain their trust and increase their awareness of project owners and their overall goals/objectives.	companies. Although there were no plans mentioned to do so, the report highlighted the need for more basic infrastructure such as health and educational institutions due to the expected increase in population. Additionally, lists of landowners which may need resettlement have been carefully documented as a pre-emptive measure. Establishment of management and training institutions is also included.
Question 6: Are there plans to build capacity at appropriate levels?	As mentioned above, one of the main activities of project owners is building capacity on all relevant levels in order to establish a strong well-founded base for geothermal energy in Ethiopia that is in compliance with the main international standards. This is reflected throughout the report with emphasis on transferring skills and knowledge to local levels.	Building capacity on local levels/ in the economy is part of the CSR plan mentioned in question 5. Additionally, mitigation measures include strengthening labor capacity in compliance with labor legislations. Engagement activities also included capacity building discussions which aimed to assess public needs in terms of skills enhancement.	Capacity building is part of the management plan where the Kenya Wildlife Service Training Institute will be established for that specific purpose as well as strengthening local capacities in environmental management.
Question 7: Have the impacts of the project or program on the various stakeholders, especially women and vulnerable groups been	Impacts have been identified and summarised in the report (Magnusdottir et al., 2017, pp. 109–111). The report discusses these impacts in a general sense without specific identification of vulnerable groups and means to accommodate them. However, in the socioeconomic	The report does a thorough assessment of project impacts during exploration, construction and operation. Tables 71, 72, and 73 outline all of these impacts including the receptors, mitigation measures, monitoring and management activities as well as the responsible authority for	Several impacts on vulnerable groups and women were identified and plans to mitigate them were put in place. Environmental and social impacts identified during all project phases are summarized in a table and include “gender and youth” as

<i>identified and addressed?</i>	survey, some stakeholder groups such as women and the elderly are identified.	each impact, performance indicators and costs (ESC, 2012, pp. 191–210). It is worth noting, however, that stakeholders identified as receptors are not specifically identified as vulnerable groups but rather just referred to as humans, village communities, etc. The CSR plan is also implemented in a manner that would support mitigation of impacts to most, if not all, stakeholders.	one of the impact categories (<i>GDC</i> , n.d., pp. 133–136)
<i>Question 8: Are there plans to mitigate adverse impacts and has local knowledge been accounted for in the mitigation plans?</i>	Local knowledge has not been discussed in much detail throughout the report. Mitigation measures are in place for project impacts yet they are not strictly context specific but rather generic measures.	Plans for mitigation of impacts are mentioned throughout the report. Local knowledge, skills, capacity and resources are also highlighted within the mitigation measures (refer to tables 71, 72 and 73 mentioned above). Examples including relying on local workers, revegetating according to local knowledge and working closely with local authorities.	Although public participation with the local community was highlighted throughout the report, the mitigation measures included are mostly technical solutions and do not mention any relevance to local social context <i>see GDC</i> , n.d., pp. 140–141).

Discussion and implications for SIA of geothermal projects

As shown in the table above (Table 3), the ESIA studies included here contain varying levels of details and specifications relative to the identified evaluation criteria questions. The main theme of this criteria revolved around stakeholders' identification, local community needs and interests, community participation and engagement, cultural context, institutional set-up, capacity building and mitigation, evaluation and monitoring plans. However, these themes were not completely reflected in all three reports. All three did discuss local stakeholders and the local context relative to the project but only in a superficial manner. For example, the Indonesia ESIA study included the following statements which describe social and environmental impacts on the affected area:

“Significance of Project Impacts

This ESIA concludes that while the ... project has potential adverse social and environmental impacts, they are few in number, site-specific, largely reversible, and readily addressed through mitigation measures (e.g., through developing a Biodiversity Action Plan).” (ESC, 2012, p. i)

It is worth noting that the previous quotation from the text was found to be common language for ESIA reports, replicating the high level of ambiguity. This lack of information can be an indication that the inclusion of these aspects within ESIA studies is only done to check off a condition rather than effectually conducting the back work necessary, as mentioned earlier (see Becker & Vanclay, 2003; Burdge, 1987).

Relative to geothermal development projects, ESIA studies evaluated above do not seem to be any different from other energy interventions/ development interventions as a whole. There does not seem to be any unique features within the ESIA reports which distinguish geothermal projects from others in terms of the approach used for stakeholder engagement/ community ownership or reliance on local knowledge. The focus on local community engagement remains to a certain degree superficial and does not go beyond the customary development projects. Both the Ethiopia ESIA and the Kenya ESIA did not mention local knowledge or means of incorporating cultural and social factors into the design and implementation/ operation of the power plant for example. Indonesia ESIA did emphasize the importance of social and cultural factors and local knowledge, yet it remained secondary to the project's activities only to enhance the project owner's image and diversify the advantage of building the power plant in this community. An example from the report is this statement which is part of the CSR campaign “... *Community relations - enhance company and community relationship through participation and contribution on local values/wisdom such as supporting community public events like religious events and celebration of national independence anniversary.*” (ESC, 2012, p. 156)

Analyzing each question from the table and starting with question 1, it is found that only the Indonesia ESIA had clearly identified stakeholders impacted by the project. Ethiopia and Kenya ESIAs mentioned certain stakeholders throughout the report yet there was no clear list/ table identifying all stakeholders and their relation to the project. More importantly, question 2, which addresses the project's objectives relative to needs and interests of impacted stakeholder groups, revealed a strong lack of inclusion of such aspects upon developing the project, particularly social and cultural aspects.

These could include religious beliefs, values, traditions, gender roles, which may all affect the perception of the project, and subsequently its outcome (Burdge & Vanclay, 1996; Dendena & Corsi, 2015). All three studies highlight the importance of geothermal energy as a clean source and list that as an objective which assists in sustainability. However, the study which slightly stands out in this regard is the Ethiopia ESIA. The Ethiopia ESIA had the objective to include the local community at all stages of project development where transfer of knowledge would occur. This is a highly positive objective as it promotes stakeholder ownership and involvement with the project which contributes to long term acceptance and success of the intervention.

Questions 3 and 4 address stakeholder participation, its efficacy and any obstacles/ challenges to it. Certain measures to enhance stakeholder participation are discussed in all three studies and arrangements to mitigate any challenges are indirectly mentioned. The three studies each used a number of engagement activities which included interviews, public consultation meetings, focus group discussions, socioeconomic household surveys, etc. These activities were conducted throughout the project phases, including the initial exploratory drilling phase. It is worth noting that the Ethiopia ESIA study referred to a stakeholder engagement plan which was not attached to the report; however, engagement activities were discussed. It can be argued that the variety of engagement activities conducted is a means of facilitating participation and ensuring all stakeholder groups participate fully, regardless of any specific social or cultural factors. However, and although all three studies conducted social surveys and were aware of the cultural diversity and the nature of social dynamics to a certain extent, no particular social/ cultural factors were clearly discussed in relation to participation and benefitting from the project.

Question 5 addresses any institutional arrangements required for participation. Similarly, all three studies indicated a level of institutional changes to sustain project activities such as record keeping (Kenya), institutional training programs (Ethiopia), etc. As for the Indonesia study, it seemed to have the most comprehensive CSR plan which may be considered an essential institutional arrangement and pertained to strengthening local capacities, enhancing local economy, improving public health and education services and so on. This can be seen to support project activities and participation from different stakeholders in addition to their trust for the project owners.

Capacity building is the main topic of question 6 and is also an important accompanying factor to development interventions. There was mention of capacity building activities in every study evaluated. Kenya ESIA entailed the establishment of a local training institute to enhance environmental management capacity in the community. The Indonesia study also discussed capacity building as part of the CSR plan mentioned above and also as part of its impact mitigation activities to assess public needs and tailor capacity building programs to them. As for the Ethiopia ESIA, the study described a comprehensive capacity building plan as part of the main project's activities. Ethiopia ESIA seemed to highlight capacity building the most and the study portrays that clearly as project owners wish to transfer knowledge and develop skills as much as possible, two-way knowledge transfer as applicable.

Questions 7 and 8 assess the impacts identified and their respective mitigation measures. Starting with question 7, I find that Ethiopia and Kenya ESIA studies identify social impacts in a general sense without specifying vulnerable groups and impacts to them. However, some stakeholder groups such as women, elderly, youth, etc. are mentioned in other sections of both studies. Indonesia ESIA study has the most intricate impact identification relative to vulnerable groups in comparison with the other

two studies. The study provides a detailed table which outlines all potential impacts to the study, social or otherwise including the groups affected by each impact. Yet context-specific social impacts on different stakeholder groups are not explicitly mentioned. In terms of mitigation measures, Indonesia ESIA remains the precedent in incorporating local knowledge and ensuring the local communities participate in project activities including mitigation of impacts. Kenya and Ethiopia ESIA studies contain mitigation tables which remain generic in nature and not contextual to the local situation.

Overall, the extent of which local knowledge, needs, interests and capacity are analyzed and incorporated into geothermal power plant projects in all three countries is quite minimal. Social analyses do not extend to the necessary lengths which would allow for a proper understanding of the local context and the need/ lack thereof for the development intervention in question. The studies seemed to mostly focus on the technical aspects of the geothermal power plant and its impacts.

A social impact chapter is part of each ESIA, in varying lengths, but it remains standardized and not tailored to the project area/ stakeholders involved. Moreover, there are various similarities in the content and approaches used, even though each study is conducted in a different country. This could be an indication that impact studies follow a universal guideline/ rulebook which is systematic and does not leave much room for customization. However, it is worth noting that the Indonesia ESIA had the most advanced approach in comparison to the other two where the effort exerted to tailor the study to local conditions was very clear. An additional observation to the analysis in this paper is the fact that there is no mention of social indicators or social approaches utilized (similar to those mentioned earlier). This creates problems with accountability, monitoring and transparency.

Limitations

Access to resources has been one of the main limitations to this study. The standard process of ESIA mandates certain confidentiality agreements which prevents most studies from being published and available for public access. This was also a factor which limited the number and variety of studies evaluated in this report. Some of the studies included in this investigation are draftESIAs and not the final reports. Additionally, all studies refer to supplementary studies/ appendices which are not available or accessible and may have contained more valuable data for this assessment. Financial, spatial and temporal limitations also played a role in determining the limited scope of this study.

Conclusion

SIA studies remain at a critical stage where there is much uncertainty and vagueness regarding its nature, components, composition, methodology, etc. Upon reviewing three SIA sections of ESIA studies from three different countries, each conducted by an independent consultant, the results resonate with the earlier discussion which indicated the high extent to which such studies remain a standard operating procedure rather than an effectual, beneficial study. This study focused on contrasting ESIA studies from different parts of the world to assess the level of familiarity of consultants and project owners with local contexts and their inclusion of local communities in all phases of project development. However, the results showed that there are only minimal differences between the reports, regardless of the geographic location or social conditions.

Approaches to SIA studies, especially those pertaining to geothermal energy development require a strict transformation in order to fully achieve any development goals/ objectives (Arce-Gomez et al., 2015). Geothermal energy is a new technology that remains unexplored to a certain extent and can be less accepted similar to other renewable energy sources such as wind energy. Accordingly, researchers and practitioners need to work collaboratively together to ensure new energy innovations do not create social conflicts and add to existing inequalities, especially in developing countries. SIA studies should be the tool to fulfill this role in mediating between communities and any technological advancements which may be regarded as disruptions to their practices, beliefs, traditions and customs. The current structure of ESIA and SIA studies has much value as it allows for the “issues-oriented” approach referred to earlier. While this approach was not adopted in the studies analyzed in this paper, I believe that with a few adjustments, more thorough analyses and a customized approach according to the local context, SIA studies may pave the way for various advancements towards a sustainable world.

This paper concludes that the adoption of ESIA studies by private consultants and the standardized methods applied have led to its detachment from reality on the ground and detachment from most stakeholders. Impacts of development projects similar to geothermal power plants may introduce new social factors which are not accounted for. Recommendations for more effective SIAs can begin with the criteria outlined earlier for evaluation. Following the criteria, which focuses on stakeholder involvement and inclusion of local knowledge in project and SIA activities, strengthens any SIA study as it fills the gaps enforced by current systematic methods.

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