

Ethics Assessment Report

CHPM2030 Deliverable D5.6

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CHPM2030



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CHPM2030 DELIVERABLE D5.6

ETHICS ASSESSMENT REPORT

Summary:

Undertaking an ethical assessment at each proposed development should be considered a part of the ESIA process. Identifying what is 'ethically acceptable', requires a detailed assessment of the environmental and social impacts from a proposed development, considered in the context of project alternatives and the broader need to supply energy and minerals. Developing an ethical matrix will help project stakeholders make informed decisions and choices in this context.

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2 Executive summary

Undertaking an ethical assessment on each proposed development is in accordance with international best practice. It is also incredibly beneficial from the perspective of International Financial Institutions who are likely to be asked to finance projects. Lenders want to know they are financing projects that are environmentally and socially responsible, where every effort is made to ensure a development has the 'Social Licence to Operate'.

An ethical assessment will identify and consider factors identified in the ESIA process that may have ethical impacts. Standard principles that need considering from an ethical perspective are issues that effect wellbeing, dignity and fairness. The ESIA will help determine what the ethical impacts and considerations are. To identify such impacts, identification and dialogue with stakeholders is essential. In the case of an ethics assessment, this will include land users and non-human species that use the land

It is essential that solutions are found to avoid ethical impacts at each proposed development. Open communication must occur with stakeholders throughout all stages of a project, prior to exploration work commencing through to decommissioning. This will help people understand what is actually going on and how impacts from a development will be managed. At the same time, it is essential that the process of engaging stakeholders also helps to provide a broader education on supply and security of energy and minerals in Europe.

As part of the ethical assessment, an ethical matrix should be developed at each proposed CHPM site. This process will help stakeholders make informed decisions about a development, providing an understanding of the likely environmental and social impacts, and how these impacts will be managed. Furthermore, an ethical assessment should also integrate with the ESIA project description and alternatives, outlining 'choices' relating to how energy and minerals are supplied and what the pros and cons are with different production and supply methods.

The Feasibility Study and ESIA process requires careful integration to manage environmental and social impacts, including making an adequate consideration of project alternatives and considering them in the context of minimising ethical impacts on wellbeing, dignity and fairness.

3 Introduction

Objectives and role of the CHPM2030 project

The strategic objective of the CHPM2030 project is to develop a novel technological solution (Combined Heat, Power and Metal extraction from ultra deep ore bodies), which will help reducing Europe's dependency on the import of metals and fossil fuels, and at the same time, lower the environmental impact of the energy supply.

In the envisioned technology, an Enhanced Geothermal System (EGS) is established on a metal-bearing geological formation, which will be manipulated in a way that the co-production of energy and metals will be possible. The project, at a laboratory scale, intends to prove the concept that the composition and structure of ore bodies have certain characteristics that could be used as an advantage when developing an EGS.

It is also planned to verify that metals can be leached from the ore bodies in high concentrations over a prolonged period of time and this may substantially increase the economics of the EGS. The project also aims to find proof for the concept that continuous leaching of metals will increase the performance of the system over time in a controlled way without having to use high-pressure reservoir stimulation. According to our expectations, this will provide new impetus to geothermal development in Europe. In the frame of the project, a roadmap will also be developed to support the pilot implementation of CHPM systems before 2025, and full-scale commercial implementation before 2030.

Scope and role of Task 5.6

An ethical assessment must consider and review ethics from the perspective of the practices and any associated products. Outlined here is the theory of what would need to be considered when undertaking an ethical assessment on a CHPM projects and associated mineral production.

Ethical considerations vary considerably based on the actual environmental and social impacts, identified stakeholders, legacy issues and how people perceive things. An ethics committee should be established at a community level and integrate the considerations of people to reflect a diverse range of viewpoints and values. From this perspective, any ethical committees developed for CHPM projects must use the stakeholder analysis and mapping methods outlined in the SIA report (Task 5.4.1 in Deliverable 5.4).

An ethical assessment must ensure adequate representation of different viewpoints. For a project like the CHPM, and associated mineral production, there is not a clear method developed at present for undertaking an ethical assessment and ensuring ethics are adequately and fairly considered within the development of a project. The sections below have outlined considerations that need to be made in any ethical assessments that are undertaken. It will be an evolving process and must link closely to the identified environmental and social impacts as described in the ESIA undertaken at each proposed development. The development of an ethical assessment at each proposed project must ensure compliance adheres to local legal and national requirements and any wider influences (for example, the EU, requirements of international financial Institutions). The purposes of the ethical assessment are to:

- Identify and evaluate critical ethical issues
- Find solutions and make recommendations to any ethical issues identified
- Ensure that the ethical assessment covers all identified issues

The ethical assessment also must adequately consult and consider the views of different stakeholders (Figure 1).

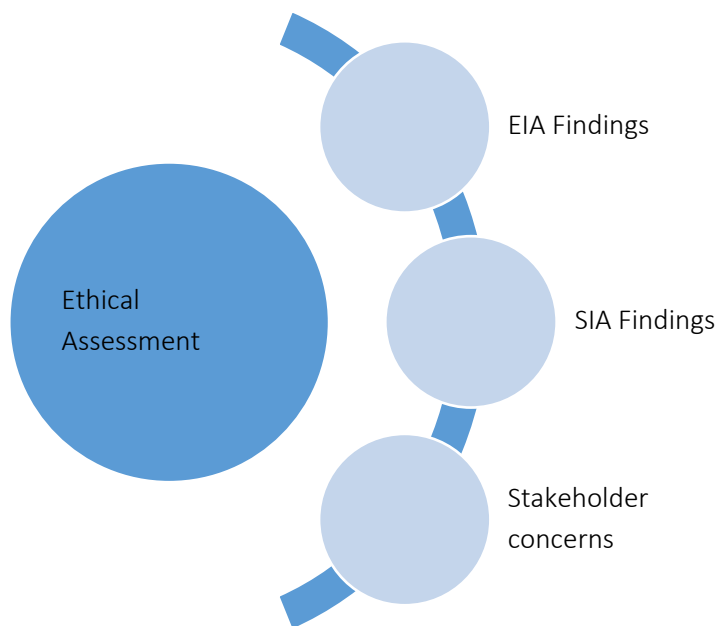


Figure 1: Ethical Assessment Considerations and Influence

In a broader sense, an ethics assessment must consider comparable methods of energy or mineral projection, considering global phenomena, such as resource colonialism and conflict minerals and how, for example, raw material production in developing countries often happens with little environmental and social controls. ‘Conflict minerals’ not only create finances that fuel conflict in countries, they often see that any potential positive socioeconomic impacts are not adequately shared within local communities.

Developing CHPM projects would enable not only a more sustainable energy supply, but also the production of strategic mineral commodities in Europe, helping secure our supply of minerals in Europe in line with key European objectives. Where negative environmental and social are identified with associated projects, adequate mitigation measures and accompanying management plans to the ESIA will ensure that these impacts are expected to be substantially lower than the impacts of energy and mining projects in developing countries, where without the right investment and management measures in place, large scale adverse impacts can occur. Public awareness of ethical decisions of the need for energy and mineral supply, and how they are produced, is unsurprisingly low. Often major adverse impacts and issues associated with conflict minerals go unnoticed by the European public. Information to raise awareness of alternative sources of energy and minerals should be generated early on in the exploration phase of a project.

Conflict Minerals in Developing Countries and the Ethical Production of Minerals

Conflict minerals are minerals that are produced in a conflict zone where the money used from their production is used to fuel the conflict and perpetuate fighting in certain countries. Tin, tungsten and tantalum are commonly associated as being conflict minerals. Diamonds and gold have also been known to fuel conflict.

The Democratic Republic of Congo (DRC) is one of the most renowned regions for conflict minerals. The DRC has a high proportion of some of the World's scarce mineral resources, such as cobalt, which is key in developing renewable technology. The DRC has many small scale and artisanal mining operations that are not well regulated or managed. From a security perspective, the DRC is known as one of the most difficult countries to 'do' business in.

Managing supply chains is key to ensuring minerals are not supplied from areas of conflict, where finances form operations are known to finance conflict. Numerous international agreements have targeted reducing resource conflict through supply chain auditing. The 2010 Dodd Frank Act in the USA was developed to require manufacturers to audit their supply chains and report on their use of conflict minerals. Due diligence work on mines and supply chains can help manage the supply of minerals from mine and smelters. For example, the International Tin Supply Chain Initiative provides a certification mechanism.

Human Rights Impacts and Management

The UN Guiding Principles on Business and Human Rights has been pivotal on providing guidance to businesses about how companies should respect and manage human rights through environmentally and socially responsible management approaches.

At a site and at corporate level, companies need to increase the integration of their teams to help understand and manage the cross-cutting considerations of human rights, including an assessment of different social and environmental impacts. At a site level, departments should develop approaches to work closely together to share information.

Executives at a corporate level need to make sure that initiatives they develop to help manage human rights impacts are fully understood at all of their sites, ensuring that they give support to positive actions taken on the ground.

To make sure that every individual energy and mining projects identify and address critical issues, operators need to carry out a review of potential and actual human rights impacts through a due diligence or audit process. If serious concerns are raised in the scoping study, the next step would be to develop a more in-depth human rights impact assessment. Any initial reviews should be followed up regularly by further reviews of conditions on site.

Public perception of the Impacts of CHPM Projects and Associated Mineral Production

It is always the case that what the public perceives, and what the actual impacts are, are often two different things. It is essential that public awareness and education occurs before any exploration work is undertaken.

Engaging stakeholders from the early stages of a proposed project is essential. The scoping study and ESIA needs to be undertaken in enough detail to allow citizens to understand the project's true environmental and social impacts. An ESIA must have an accompanying 'Non-Technical Summary' to help stakeholders

understand what the identified impacts are and what mitigation measures are being developed to help manage these impacts.

4 Ethical Matrix Methods

Ethical Matrix methods were developed by Ben Mepham in the 1990’s for assessing uses of different technologies. These methods were initially outlined to take into account stakeholder considerations for justice, dignity and welfare. Mepham et al. (2006) developed an ethical matrix manual. The key aspects of the ethical matrix are summarised below.

An ethical matrix is a conceptual decision making tool allowing stakeholders to make informed decisions about ethics, identifying what is ethically acceptable. Although Mepham et al. (2006) were focused on food and agricultural sectors, the same theory applies to CHPM and mining projects. They outline the standard principles as being (refer to Table 1):

- Wellbeing
- Dignity
- Fairness

Stakeholder	Well-being	Dignity	Fairness/Justice
Stakeholder 1			
Stakeholder 2			
Stakeholder 3			

Table 1: Example of an Ethical Matrix

Table 1 can be developed using the stakeholder mapping using the stakeholder mapping exercise outlined in the SIA. The list of stakeholders will be expanded beyond a traditional list of stakeholders, including other factors such as the physical environment, associated ecosystems services and key land-users including animals that are grazing affected areas.

Factors such as wellbeing might consider the following aspects:

- Health and safety considerations for local people
- Safety and security in the workplace
- Profitability
- Ensuring land quality remains the same
- Safe and profitable use of resources
- Health risks
- Activities that threaten the health or living conditions for land users of project affected people
- Ecosystems and ecosystems service users

Factors such as dignity might consider the following aspects:

- Worker's rights
- Respect for stakeholders
- Respect for land users
- Wider societal benefit through more sustainable production of energy or minerals
- That the mitigation hierarchy outlined in the ESIA is implemented in this order for adverse environmental and social impacts: to avoid, minimise/reduce and compensate for impacts. This in turn will ensure that any adverse effects on the physical environment and affected communities are limited.

Factors such as fairness/justice might consider the following aspects:

- Fair conditions for workers
- Fair terms for industries
- Fair access to resources for land users and ecosystems services users
- Promotion of fair access to benefits for energy and minerals for all people in society, including people of all income levels
- Ecosystems conservation for future generations
- Effective management of environmental and social impacts

As outlined in the EIA, EGS operations must consider a range of environmental factors and social factors (refer to section X, the SIA report).

Of key concern for the ethical assessment, is the possible radiological background of the geothermal brine (and possibility of groundwater contamination), possible seismicity generated by EGS projects, air quality, hydrology and hydrogeology (thermal pollution), biodiversity, noise and vibrations, surface and construction disturbances. The main causes of environmental impacts are considered in relation to the exploration, construction, and operation and decommissioning of facilities and the power plant.

Seismicity concerns relating to EGS installation have been mentioned widely in the media and is an area of concern that continues to be researched. The EIA report highlights the need for continued monitoring of seismic hazards and induced seismicity over the course of a project. It also emphasises the need to improve social acceptance by establishing dialogue with stakeholders and using regular opportunities to engage with stakeholders to educate people about the technology behind EGS projects and the on-going monitoring process and accompanying findings. From an ethical perspective, this is essential and is bound to be one of the key areas of concern on any proposed project.

Water usage on EGS projects will be carefully considered in the EIA and relevant environmental management plans. Most operations use a closed-loop system to conserve water and reduce issues with thermal exchange of hot water.

From a visual perspective, development of EGS projects will later the physical landscape and therefore it will have visual impacts for some communities. The largest visual impact will be during the exploration phase of

the project, where the drilling rigs are present on site. Further project infrastructure, including pipelines and electrical wires, will also create visual impacts.

In relation to the social impacts, key concerns are likely to be: the environmental impacts, land use, effects to land and ecosystems service users, possible relocations from a project, public safety, and safety of workers, impacts on cultural heritage, local employment, community benefits and stakeholder engagement. It is essential that land use is fully understood around a project, identifying and communicating with land users to understand the effects of land take on people/groups of people who may be disadvantaged. In the ethical matrix, this overlaps with well-being, dignity and justice.

As described in the SIA report, identifying and communicating with vulnerable groups is essential from an ethical perspective. In addition, each proposed development must consider the geopolitical environment and effects on a project. This includes understanding the presence and aims of NGO's that operate in an area. NGO's should be engaged with on many different scales, from a local to a national and even international level.

From a land use perspective, the footprint of hydrothermal power plants vary considerably but it generally quite small compared to comparable methods used to generate energy. This in turn creates less visual disturbance.

Impact identification methods often differs between an EIA and SIA. Methods outlined in the EIA, refer to the establishment of context, identification of risks, evaluation of risks then the treatment of risks. This entire process obviously links to the requirement to monitor and review changes to the environmental baseline and how impacts, and the need to communicate and consult with stakeholders.

The EIA outlines how the risk assessment process utilises a risk matrix for the qualitative evaluation of impacts (risks). Figure 4 in the EIA and Figure XXX in the SIA should be referred to and understood in the context and development of the ethical assessment. The EIA method for determining the significance of environmental impacts considers the magnitude, nature of the impact receptor (physical, biological or human), likelihood (probability of occurrence) and significance of the impacts which is derived from the sensitivity of the receptor combined with the magnitude of the impact and likelihood of occurrence. The key factors identified within the EIA for establishing impact significance include:

- Level of public concern,
- Scientific and professional judgment,
- Disturbance/disruption of the environment, and
- Degree of negative impact on social values and quality of life (IAEA, 2005).

From an ethical perspective, all these aspects are important and need considering with the development of the ethical assessment and matrices.

This process is essential for the ethical assessment, alongside integration between the management of impacts in the EIA and SIA.

These principles form columns in an ethical matrix against rows of affected groups (stakeholders) as identified in the stakeholder mapping exercises when a Stakeholder Engagement Plan is developed in the exploration phase of a project. Stakeholders/affected parties must include any non-human species such as farm animals that may be affected by land take associated with a development. The matrix should be developed further for each site utilising the identified impacts from the ESIA with the project stakeholders and land users.

As described in the SIA (Task 5.4.1 in CHPM deliverable D5.4), the Aarhus Convention which was ratified in 2002, outlined 3 key areas of provision of information to the public:

1. Access of information
2. Public participation
3. Access to justice

Responsibility from the Aarhus Convention rests with the host government for a project. This does require that a proposed project developer adequately discloses environmental and social impacts to stakeholders. This feeds into all aspects of how an ethical assessment is developed.

Banks financing projects will be interested in the development of a projects ethics. Free, Prior and Informed Consent (FPIC) links directly to ethics and should be considered in the scope of how a project develops.

The ethical matrix will utilise the risk assessment aspect of the ESIA, looking at the probability of things happening against the harm if it occurs. For any CHPM project, the ethical matrix should consider all phases of the proposed project development from exploration to operation, closure and post-commissioning. It may well be beneficial to outline an ethical matrix for each phase of the project during project exploration, with regular updates and reviews being undertaken as the project moves through different phases and possibly also as stakeholders change. Project alternatives must be considered and reviewed by stakeholders in the development of the ethical matrix.

Benefits of CHPM in Helping Secure Energy and Resources Supply in Europe

Europe faces challenges both in maintaining its energy supply and in reducing its dependence on fossil fuels in line with key goals. The same applies to the supply and security of minerals. Critical raw materials have been identified by the EU and the aim across Europe is to look at how we can improve our resource security through developing new deposits or new methods of mining. CHPM technology has the potential to have a positive contribution to the supply of energy and minerals, where these methods will help meet market demand and improve resource security.

CHMP projects are developmental, aiming at utilising and combining existing technologies. The ability to economically extract minerals from geothermal brines is not known. From an ethical perspective, pilot projects and full scale projects need to demonstrate how they pose a low risk, with any risks being easily managed. They must also address any stakeholder concerns that arise, helping educate people of the benefits of these methods, and how mitigation measures will be successfully implemented to manage any adverse effects. In addition, it is essential that educational measures are embedded in stakeholder meetings to increase the

awareness of the broader benefits of producing a more sustainable and secure energy and mineral supply. It is essential that this happens so each proposed project can secure their 'Social Licence to Operate'.

Utilising the mineral by-products from CHPM provides synergistic benefits of producing geothermal energy at the same time.

As outlined in the EIA, reviewing project alternatives and selecting sites that have the least environmental and social impacts is key. Undertaking a detailed project description and project alternatives section is essential, as outlined in the EIA (CHPM deliverable D5.5).

The broader effects of climate change and attribution to human activity have been described in detail in the EIA. From an ethical perspective, minimising climate change requires consideration at a global level and any project that can reduce carbon emissions is beneficial. CHPM projects provide a cleaner sources of energy and the ability to extract minerals as a by-product. The wider ethical benefits like this should be considered and publicised in the ethical assessment and matrix. It is obviously essential that stakeholder awareness and education helps publicise the positive contribution that CHPM projects can make with regards to providing a cleaner source of energy compared to fossil fuels. The challenge is still that across Europe, in many countries, such as Poland, there is still a wide economic reliance on energy from coal projects as a major source of employment. The geopolitical aspects are of key consideration in any ethical assessment that is undertaken, including helping contribute to meeting Europe's aims to reduce GHG's and help manage the effects of climate change.

It is essential that the ESIA and ethical assessment leads to the development of accompanying environmental and social management plans that are developed from framework plans in the ESIA to full plans before a project becomes operational. This will be key to managing adverse impacts adequately and in ensuring that positive aspects, such as local employment and community projects/benefits, are maximised.

Ethically, the fairness of benefits from a project must be identified in the conceptual stage of a project and developed with communication with stakeholders, particularly local stakeholders who will be most affected from any adverse environmental and visual impacts associated with a proposed project. The perception of fairness is therefore essential to consider.

With regards to the environmental impacts of associated mining operations, the EIA outlines the following benefits compared to conventional mining methods:

- Lower capital and operating costs
- Shorter lead times for mine development
- Much smaller workforce required
- More flexible mine planning and quicker ramp-up in response to market improvements
- Inherently safer working environment
- Limited environmental impacts
- No waste rock
- No tailings
- No ore dust or direct ore exposure

- Lower consumption of water
- Economic recovery of lower grade ores (increases resource utilisation)

Negatives with CHPM to sites in Europe

As outlined in the EIA and SIA sections, undertaking a Feasibility Study and accompanying ESIA is essential to consider the economic feasibility of a project against the environmental and social impacts (both positive and negative). This will outline the ethics of a project and the alternatives from the perspective of both the site and broader energy and mineral supply alternatives in Europe.

Impacts must be considered across all phases of a project and it is essential that the Feasibility Study and ESIA link adequately to each other so the identified environmental and social impacts are considered in the project design. Quite often, this doesn't happen adequately. Ensuring the integration and discussion occurs between all members of the project team (engineers, project managers, community liaison officers and environmental managers) is essential to allow an ethical matrix to be developed and stakeholder considerations to be taken into account.

As outlined in the EIA, whilst geothermal energy is generally considered to be relatively environmentally benign, any project development is not going to be completely free from impacts on the environment. In terms of the connection between public perception and actual environmental impacts from an ethical perspective, stakeholder concerns are not always linked to the reality of the key environmental concerns. The same applies to social aspects, where job creation opportunities and community benefits are always key considerations by local stakeholders and community groups.

With novel technologies like CHPM, public confidence is essential to gain to ensure projects are supported and that the impacts are understood by the public with opportunities given on a regular and on-going basis for stakeholder concerns to be raised and promptly addressed. The Stakeholder Engagement Plan outlines information on how stakeholders should be mapped, engaged with and for information on the grievance procedure.

The EIA identifies some environmental issues associated with the mineral extraction from EGS projects, including possible contamination of groundwater and acid mine drainage. From an ethical perspective, this needs closely monitoring with findings reported to stakeholders and in particular close liaison with water users. Stakeholders could also be actively involved in baseline identification programmes and the on-going environmental monitoring programmes to help engage and reassure people about what is going on. Impacts from acid mine drainage will be outlined in the scope of the ESIA. If there is the potential for issues with acid drainage, long term monitoring programmes need to be developed for as long as there is considered to be an issue after de-commissioning.

Combined Environmental and Social Impacts and Cumulative Considerations for the Ethical Assessment

Table 2, taken from the EIA, summarises the impacts for various activities related to a model CHPM initiative regarding stakeholder perception. It outlines how the magnitude, frequency, likelihood and consequence of

each impact can be developed. This table is important to consider and develop further with respect to the ethical assessment at each site, ensuring that this is done throughout each stage of a project and is based on local stakeholders and site specific conditions.

For developing the ethical matrix further at each site, Table X presents a good starting point, where more detail can be taken from the ESIA and stakeholder engagement plan. In the left hand column outlining each environmental and social impact, the key ethical consideration(s) have been outlined. This needs verifying at each site based on the stakeholders present and the impacts created from the proposed development.

The cumulative impact assessment, and associated ethical considerations, can be identified at the end of the ESIA process. Quite often, the cumulative impact assessment is seen as an afterthought at the end of an ESIA. Best practice is to give real consideration to identify the real cumulative effects of combined environmental and social impacts. In the context of the ethical assessment, identification and involvement of project stakeholders is also essential.

Table 2: Impact Summary

Environmental and social impacts (ethical matrix highlighted in bold in brackets)	Activity stage								
	Expl.	Construction			Operations				Decommissioning
	Well drilling	Land preparation / Mobilisation	Well Drilling / Plant Facilities	Transmission Pipeline / Road	Well drilling	Power Generation	Transmission Pipeline / Road	In-situ leaching	
Physical-Chemical									
H2S Emissions (wellbeing)	neg		neg		neg	neg			
GHG (wellbeing)						neg			
Heavy metal emissions (wellbeing)	neg		neg		neg			neg	
Dust (wellbeing)		neg	neg	neg			neg		neg
Noise (wellbeing)	neg	neg	neg		neg	neg			neg
Erosion and sedimentation/ water quality, increased run-off rate (wellbeing)	neg	neg	neg	neg	neg				neg
Ground- and surface water usage (wellbeing)		neg	neg		neg	neg		neg	
Induced seismicity (wellbeing)	neg		neg						
Solid and liquid waste (wellbeing)		neg	neg	neg	neg	neg		neg	neg

Hazardous waste (wellbeing)		neg	neg	neg				neg	neg
Biodiversity									
Flora (wellbeing)	neg	neg	neg	neg	neg	neg	neg	neg	neg
Fauna (wellbeing)	neg	neg	neg	neg	neg	neg	neg	neg	neg
Invasive species (wellbeing)	neg	neg	neg	neg	neg	neg	neg	neg	neg
Social & Cultural									
Employment opportunities (Dignity, Fairness)	pos	pos	pos	pos	pos	pos	pos	pos	pos
Workforce impacts on communities, disease, cultural, drain on local resources, etc. (Dignity, Fairness)		neg	neg	neg					neg
Business opportunities (Dignity, Fairness)	pos	pos	pos	pos	pos	pos	pos	pos	pos
Cultural heritage (Dignity, Fairness)		neg	neg	neg	neg	neg	neg	neg	neg
Land acquisition / Economic displacement (Wellbeing, Dignity, Fairness)	neg	neg							
Community concern (Dignity, Fairness)	pos/neg	pos/neg	pos/neg	pos/neg	pos/neg	pos/neg	pos/neg	pos/neg	pos/neg
Indigenous people (Wellbeing, Dignity, Fairness)	neg	neg	neg	neg	neg	neg	neg	neg	neg
Community Health, Safety and Security (Wellbeing, Dignity, Fairness)			neg	neg	neg	neg	neg	neg	neg
Traffic and Transportation (Wellbeing, Dignity, Fairness)		neg	neg	neg					neg
Workforce									

Occupational safety and health (OSH) (Wellbeing, Dignity, Fairness)	neg	neg	neg	neg	neg	neg	neg	neg	neg
Compliance with labour legislation (Wellbeing, Dignity, Fairness)	neg	neg	neg	neg	neg	neg	neg	neg	neg
General									
Cumulative and Transboundary Impacts – Influx (Wellbeing, Dignity, Fairness)		neg	neg	neg	neg	neg	neg	neg	neg
Loss of Opportunity (Business, Employment)- construction and decommissioning (Wellbeing, Dignity, Fairness)		neg	neg	neg					neg

Section 10 of the EIA report suggests how potential significant impacts can be mitigated. Mitigation measures will vary depending on the actual impacts identified and the site and stakeholders. Mitigation measures that are developed should take into account the findings of the ethical assessment undertaken at each proposed development. Further development of the ESMP, from a framework plan to a full plan, must integrate ethical considerations and be undertaken alongside stakeholders.

5 Conclusions

This report outlines how an ethical assessment should be carried out, the theory behind ethical assessments and what the key drivers are for doing so. Environmental and social impacts identified in the ESIA process will help outline what the key ethical impacts are. This should be considered in relation to wellbeing, dignity and fairness/justice. An ethical matrix should be developed for each site for each project phase from project conception to decommissioning, identified for all project stakeholders including non-human species like animals being grazed around a site.

An ethical assessment will be an evolving process, requiring regular updates and dialogue with stakeholders and 'project affected people'. To ensure a project gains the 'Social Licence to Operate', honest and open stakeholder dialogue is essential. This includes considering how to increase awareness of energy and mineral supply and alternative sources and associated environmental and social impacts with those methods. The concept of 'nimby-ism' (not in my backyard) is evident on any proposed development to some degree, however, stakeholders should be educated about broader issues such as 'conflict minerals', the need to supply minerals in Europe, and GHG emissions contributing to climate change from energy generation from non-renewable sources.

This report highlights key components and considerations that will need to be made in an ethical assessment. The process of undertaking an ethical assessment is likely to be a complex process, reliant on the ESIA findings and baseline/mitigation management process. There is not an extensive body of knowledge in this field and it is still relatively speaking in its infancy.

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