Sustainable mining, local communities and environmental regulation

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ABSTRACT

Sustainable mining is an objective as well as a tool for balancing economic, social, and environmental considerations. Each of these three dimensions of mining – and sustainable development – has many components, some of which were chosen for closer study in the SUMILCERE project. While there is no single component that in itself provides a definitive argument for or against sustainable mining, the research reveals some that have proven valuable in the process of balancing the different dimensions of sustainability.

In the SUMILCERE project, comparative studies enabled us to identify factors such as the following, which are essential when discussing the balancing in practice of the three dimensions of sustainable mining cited above: the framework and functionality of environmental regulation to protect the environment (environmental sustainability); the

competitiveness of the mining industry in light of environmental regulation and its enforcement (economic sustainability); public participation and the opportunities local communities have to influence their surroundings, as well as communities' acceptance of projects (social sustainability) before and during operations; and the protection of Sámi cultural rights in mining projects (social and cultural sustainability).

Although each of the three dimensions of sustainability leaves room for discretion in the weight assigned to it, ecological sustainability, protected by smart environmental regulation and minimum standards, sets essential boundaries that leave no room for compromises. Economic and social sustainability are possible only within these limits. Details of the analyses in the Kolarctic area and accounts of the methods used can be found in the cited SUMILCERE articles.

Keywords: *sustainable mining, environmental regulation, local communities, Sámi people, social licence to operate, public participation, social impact assessment*

INTRODUCTION TO SUSTAINABLE MINING AND BACKGROUND STUDIES AND METHODS

"Sustainable development" is understood to mean development in which the needs of the present generation should be met without compromising the ability of future generations to meet their own needs. Sustainable development includes at least economic, social, and environmental dimensions. For example, these three dimensions are addressed in the Swedish Strategy (2003/04:129) for Sustainable Development.

As a concept, sustainable development sounds reasonably clear but is in fact very abstract. Indeed, one may question the extent to which this general objective is met in operative mining projects that make extensive use of raw material resources. This article, a synthesis of the research project Sustainable Mining, Local Communities and Environmental Regulation in the Kolarctic Area (SUMILCERE), examines mining with reference to different aspects of sustainable development in Finland, Norway, Russia, and Sweden, and in particular the Kolarctic areas of these countries.

The concept of sustainable development was originally defined by the World Commission on Environment and Development (WCED) in 1987. The European Council in Gothenburg (2001) adopted the first EU Sustainable Development Strategy (SDS) and the definition was confirmed in the renewed EU Sustainable Development

Strategy (EU SDS) published in the year 2006. Moreover, sustainable development is mentioned as a part of the principle of integration in article 11 of the Treaty on the Functioning of the European Union (TFEU, OJ 26.10.2012 C 326/47) and in article 37 of the Charter of Fundamental Rights of the European Union (OJ 30.3.2010 C 83/389).

Finland and Sweden, as EU Member States, and Norway, as a party to the EEA, have each adopted their own strategies for sustainable development. The Finnish (2006), Norwegian (2002), and Swedish (2003) strategies have been completed under different action plans. According to Lukyanova (2010, 26), in Russia sustainable development is the focus of two presidential decrees: "Concerning the Russian State Strategy for Environmental Protection and Ensuring of Sustainable Development" (1994) and "Concept of the Transition of the Russian Federation to Sustainable Development" (1996). In another example from national legislation, the preamble of the Russian Federation Law on Environmental Protection (No. 7-FZ) from the year 2002 says:

> *In accordance with the Constitution of the Russian Federation everybody has a right to a favourable environment, everybody shall preserve the nature and the environment, carefully deal with the natural wealth being a basis for the sustainable development, life and activities of the peoples inhabiting the territory of the Russian Federation.*

In Finland and Sweden, sustainable development is also mentioned in the objectives of the environmental protection Acts (Finnish Environmental Protection Act 2014, section 1 and Swedish Environmental Code 1998, chapter 1, section 1). Moreover, Norway's action plan for sustainable development, a chapter in the 2004 National Budget, notes, among other things, that the Pollution Control Act and the Planning and Building Act govern matters of central importance for the use of natural resources and the environment and are thus relevant administrative instruments for sustainable development (Norway's action plan for sustainable development 24–25). In sum, sustainable development has strong support on the strategic and regulatory level in all the countries studied.

Environmental sustainability, and especially the protection of ecological processes for that purpose, is a "tough nut" in the extractive industries. In particular, open-pit mines always change the environment and an area's ecological conditions. Although technical solutions and different standards in environmental regulation can diminish harmful environmental impacts by the extractive industries and an area can recover ecologi-

cally to some extent in due course, the industries still cause substantial changes in the natural conditions. Although ecological constraints set particular limits on social and economic development in society, the sustainability of mining is ultimately a matter of balancing environmental, economic, and social dimensions.

The overall objective of the SUMILCERE project was to study the extent to which sustainable mining is promoted (and hindered), and on this basis offer a set of tools and recommendations for the mining industry, local communities, and public authorities. The comparative studies enabled us to identify issues such as the following, which are essential when discussing the balancing in practice of the three dimensions of sustainable mining:

- the framework and functionality of environmental regulation to protect the environment (environmental sustainability);
- the competitiveness of the mining industry in light of environmental regulation and its enforcement (economic sustainability);
- public participation and the opportunities local communities have to influence their surroundings, as well as communities' acceptance of projects (social sustainability) before and during operations; and
- the protection of Sámi cultural rights in mining projects (social and cultural sustainability).

All four issues are interlinked and their roles in the context of sustainable mining are examined in detail in the peer-reviewed scientific articles written in conjunction with SUMILCERE:

1. Transboundary EIA in the Barents region (Koivurova et al. 2014),
2. License to mine: A comparison of the scope of the environmental assessment in Sweden, Finland and Russia (Pettersson et al. 2015),
3. Law and self-regulation (Nystén-Haarala et al. 2015),
4. Environmental regulation and competitiveness in the mining industry (Söderholm et al. 2015),
5. Social sustainability of mining in the northern communities (Suopajärvi et al. 2015),
6. Social licence to operate (Koivurova et al. 2015c),
7. Social licence to operate for mining companies in the Russian Arctic (Riabova and Didyk 2014), and
8. Legal protection of Sámi traditional livelihoods from adverse impacts of mining (Koivurova et al. 2015a).

The articles draw on research methods from the legal and social sciences as well as economics and include a number of comparative studies. Koivurova et al. 2014 (number 1), Pettersson et al. 2015 (number 2), Nystén-Haarala et al. 2015 (number 3) and Koivurova et al. 2015a (number 8) combine legal dogmatics, regulation theory, legal sociology, and legal comparison in different ways (Kokko 2014, 289–297, 300–311). Söderholm et al. 2015 (number 4) explore an analytical framework based on a review of the existing empirical literature and on a conceptual analysis of the environment–competitiveness trade-off. Suopajärvi et al. 2015 (number 5) employ a qualitative and data-driven approach drawing on 85 semi-structured, thematic interviews. Literature reviews and case study analyses feature in the articles about social licence to operate (numbers 6 and 7). The sections to follow highlight the results of the research programme, albeit with no intention of being exhaustive.

FRAMEWORK AND FUNCTIONALITY OF ENVIRONMENTAL REGULATION IN MINING PROJECTS

Binding environmental regulation sets minimum standards for controlling pollution from mines. The formal institutional framework for mining and mining activities was studied in Sweden (as the main focus of the study) and in Finland and Russia (as comparative sites). Although the comparative study was done at the national level, it is noteworthy that Sweden and Finland, as EU Member States, have transposed Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) as well as other relevant environmental directives, into their national legislation (Söderholm et al. 2015, 136).

Of particular interest were the licensing process and the extent to which environmental considerations were incorporated into it; that is, the focus was trained on administrative legislation. The licensing, or permitting, process was presumed to be an important factor for controlling the use of natural resources and limiting harmful environmental impacts of mining activities. Generally speaking, the principle is that environmental impacts should be assessed before a permit is granted and should be limited by the permit conditions (Pettersson et al. 2015, 238). During the operation phase of a mine, compliance with the conditions should be ensured by supervision, carried out by public authorities, for example.

In Sweden, mining-related activities are controlled using a concession-based system and typically require the following permits: a) an exploration permit, which is granted for the purpose of exploring an area for the presence of concession minerals. The permit gives the

permit holder an exclusive right to search the area and precedence in receiving a mining concession; b) a mining concession, which determines the area in which the concessionaire has a fundamental right to explore and exploit deposits covered by the concession. The decision to grant a mining concession must be preceded by an environmental impact assessment (EIA), in which the impacts of the concession on different land-use interests, including reindeer herding, are assessed; c) an environmental permit, in which the conditions for the activity in terms of emission limits, for example, are established. An EIA describing the environmental impacts of the activity and setting out appropriate measures to reduce the adverse environmental effects must accompany the application for an environmental permit; d) building permits for all adjoining buildings; and e) a land allocation decision determining what land within the concession area can be used for processing the ore deposit. The spatial planning system also constitutes an important part of the licensing process as a whole. The main policy instruments are found in the Minerals Act (1991:45), the Environmental Code (1998:808), and the Planning and Building Act (2010:900). The public authorities using the instruments are primarily the Mining Inspectorate of Sweden, the land and environmental courts, the county administrative boards, and the municipalities (Pettersson et al. 2015, 239–242; Bäckström 2012, 185).

In brief, the regulatory framework for mining in Sweden follows a hierarchical order in which the mining interest has precedence. While the licensing process primarily aims to establish rights and set conditions for the activity, the influence of the environmental assessment – for example its potential to actually prevent mining operations by preserving the status quo (zero option) – is limited in theory and virtually non-existent in practice (Pettersson et al. 2015, 243–244).

The main weakness of the Swedish legal framework for mining is probably that the two main laws in the area have different purposes. While the Environmental Code is clearly guided by the objective of sustainability, the Minerals Act has the explicit purpose of resource exploitation. Accordingly, since the function of the Code is primarily to control the environmental impacts of an activity and not to assess its permissibility, a licence is typically granted despite the intention that the laws should all apply in parallel. The legal framework for mining in Sweden is thus basically characterized by a hierarchical order in which environmental interests play second fiddle (Pettersson et al. 2015, 251). In Finland, the implementation of a mining project requires several permits in keeping with several different environmental laws. Prospecting, exploration, and the exploitation of minerals are subject to the provisions of the Mining Act (621/2011). Before a decision on a mining permit can be made, the environmental impacts of the project

must be assessed in a particular procedure prescribed by the Act on the Environmental Impact Assessment Procedure (468/1994). In addition, a project needs at least environmental protection and building permits. As a rule, spatial plans are also needed in order to reconcile mining-related land use with that of other livelihoods or housing. The statutes governing these permits and plans are the Environmental Protection Act (527/2014) and the Land Use and Building Act (132/1999). The mining permit is usually granted by the mining authority, the environmental permit by the regional state administrative agencies, and the building permit by municipal authorities. The environmental impact assessment is carried out by the project developer and coordinated by the responsible Centre for Economic Development, Transport and the Environment (Pettersson et al. 2015, 245–247; Kokko et al. 2014, 28).

In Finland, the recent revisions of the Mining Act and the Environmental Protection Act appear to have enhanced the coherence between the different laws that govern the licensing of mining operations (Pettersson et al. 2015, 251). However, each of the administrative procedures involved usually has a public participation phase of its own, whereby joining these as far as possible would lighten the licensing process overall. Owing to various factors, the procedures do not always progress linearly or according to schedule, meaning that the legislation should provide some flexibility; it could even be disadvantageous to the overall schedule of a project to be forced to wait for each sub-process to finish and to have to follow a possible predetermined set of rules if and when changes occur during project planning and different administration processes. In this perspective, concurrent processes that are not precisely tied beforehand to a set of orders are justifiable and reasonable. The complex whole currently in place, however, tends to cause confusion and uncertainty among the public and the industry, and does not always serve the desired purpose of the regulation. It is therefore useful to continue looking for ways to coordinate and integrate mine-related permit and other administrative procedures (Kokko et al. 2014, 33).

In Russia the exploration and production of subsoil resources, including minerals, also require a sort of mining licence. The main statutes are the Subsoil Law of the Russian Federation (1992) and the regulations on the Licensing of Subsoil Use issued under this Act. The legislation distinguishes three types of subsoil use licences: licences for exploring, production, and enlargement (these can be then combined into a single licence). The licensing system is implemented and licence applications granted using a uniform procedure administered by the Federal Subsoil Resources Management Agency (Pettersson et al. 2015, 248–249).

The potential environmental impacts of a mining project are assessed in the planning stage by implementing several laws, most notably the Law on Environmental Protection (2002) and the above-mentioned Subsoil Law. The laws require that an environmental impact assessment be carried out in accordance with the Law on Ecological Expertise (1995 No. 174-FZ). However, following the partial dismantling of Russian environmental law, the scope of application of the Law on Ecological Expertise has been limited with respect to EIA. First, the possibility for the public to confer in due course on revising scientific requirements in what are known as environmental expert reviews has been revoked and, second, the law only applies to a restricted number of mining projects, such as those located on the continental shelf or in conservation areas. The overwhelming majority of mining projects are therefore not covered by the provisions of the law (Pettersson et al. 2015, 249–250). This deregulation clearly jeopardizes the legitimacy of decisions on mining in the eyes of the public, and self-regulation of the companies is needed to advance EIA in mining projects.

At first glance, the legal framework for mining in Russia appears to be rather modern, with declarations of sustainable resource management and environmental laws including EIA rules that, it is claimed, are applicable to mining operations. "In practice, however, significant weaknesses can be detected; the declarative character of Russian environmental law is not followed up by substantive rules and both the application and the implementation seem to suggest that proper environmental concerns cannot be guaranteed" (Pettersson et al. 2015, 251–252).

In all the countries studied, the minimum level of environmental protection for mining activities is set by binding legal rules and is guided by considerations of sustainable development. The primary regulative objective is to seek a balance between the exploitation and preservation interests and to achieve sustainable resource management. In spite of this, serious implementation gaps seem to exist. This can be explained, at least in part, by the fact that institutional change is typically hampered by the path dependence that characterizes existing systems and that makes implementation dependent on existing policy and practice (see Pettersson et al. 2015, 252–253).

The challenges for the environmental regulation system are linked, on the one hand, to its coherence and consistency and, on the other, to the legitimacy of the relevant legal processes. The results of the project indicate that proper interaction and equability

between mining laws and environmental laws are very important for environmentally sustainable mining and that the legal framework should provide room for adequate public participation in mining projects to enhance social and cultural sustainability. At the same time, public participation should be coordinated and integrated in the administrative processes so that the results are economically and socially sustainable. Smart environmental regulation alone cannot guarantee ecological sustainability; institutional changes in both governance and management are needed.

ENVIRONMENTAL REGULATION AND COMPETITIVENESS IN THE MINING INDUSTRY

As part of the practical implementation of the Lisbon Strategy, the EU launched a BEST project in 2004 that made a series of recommendations to the Member States and the Commission on how to reduce administrative burdens on businesses that are subject to environmental regulation. The EU Member States have developed national programmes for reducing those burdens by simplifying legislation and the framework for its implementation. In practical examples of such actions, Finland has informed the BEST project expert group of the country's comprehensive reassessment of permitting requirements, a development linked with extensive administrative structural reform in the country, and Sweden has undertaken an initiative to simplify permit schemes by introducing notification (BEST project expert group 2006, 21–22). The BEST project was problematic in its overlooking the fact that sustainable industries entail other considerations than merely economic ones. Moreover, if, with a view to industrial competitiveness, the BEST project sees economic factors solely as a matter of tempered administrative burdens, that understanding is oversimplified.

This section describes the main results of the SUMILCERE study on Finland, Russia, and Sweden dealing with environmental regulation and competitiveness in the mining industry. Balancing environmental and economic sustainability was an express objective of the study, as the research undertook to investigate to what extent and under what circumstances industrial pollution regulations can be designed to achieve positive environmental outcomes as well as sustained competitive strength in the mining industry (Söderholm et al. 2015, 131).

In fact, the argument that environmental regulation has negative impacts on industrial competitiveness is not strong, and it has been challenged, for example, in the Porter

hypothesis. The weak version of the hypothesis essentially argues that "properly-designed" environmental regulations will stimulate environmental innovation, and the strong version that such regulations will increase not only the environmental but also the economic performance (e.g. profits and productivity) of industries (Porter and van der Linde 1995; Söderholm et al. 2015, 134). The SUMILCERE study did not explicitly test the Porter hypotheses; rather, it addressed the issue of how environmental regulations should be properly designed (Porter's criteria) and implemented to ease tension (if any) between regulatory demands and competitiveness (Söderholm et al. 2015, 135).

Environmental regulation is a factor usually taken into consideration before foreign direct investments in the mining industry are allowed. An EIA, for example, may already be considered a precondition for foreign direct investments that will have an effect on the environment (Pohjanpalo 2015, 242).

The results of the SUMILCERE study support the empirical research showing that geological potential and political stability are the most important factors in mining companies' choice of location for development. While mineral policies also matter, in general environmental regulations have not constituted a major impediment to investment. In fact, politically stable countries tend to be those with the strictest environmental regulations (Söderholm et al. 2015, 132). It can be concluded that it is not strict standards as such in environmental regulation that pose an obstacle to foreign direct mining investments but uncertainties in that regulation and its enforcement.

In the Fraser Institute's ranking of mining countries, Sweden and Finland are at the top, while Russia is not perceived as offering particularly stable regulatory conditions for mining companies (Wilson and Cervantes 2014, 32, 72). Uncertainties regarding the stability and consistency of environmental regulation and the timeliness of the regulatory processes decrease the propensity to invest in potential target areas. Whether regulations appear to be based on scientific knowledge or not is also important in this respect. The uncertainties facing mining companies thus stem not only from the time it takes to get a permit (ex ante), but also – and not least – the nature of the conditions laid down in the permit (if granted, ex post). For instance, in Sweden today there is no re-assessment of permits, and the country, as well as Finland, suffers from a lack of administrative resources; in Russia one generally does not see strict monitoring and enforcement activities taking place. In both Finland and Sweden, industry representatives frequently request a more expert-based and consensus-seeking regulatory approach (Söderholm et al. 2015, 140).

The empirical investigations of the SUMILCERE study show that overall in all three countries – regardless of some important differences across them – a lack of timeliness and predictability in environmental regulations has constituted a significant obstacle to, or at least a limitation on, investments in new (or expanding existent) mining operations (see Söderholm et al. 2015, 140). Figure 1 below describes the terms "timeliness", "predictability", "flexibility", and "stringency" as understood in this study. Thus, for example, strict standards are not the problematic consideration for foreign direct investments. Such standards can even increase the competitiveness of the mining industry if their being tightened is predictable and the industry is allowed some flexibility in timetables and performance where compliance is concerned. The study suggests that there is a need to extend the time horizons of regulations as well as to emphasize a simple, rule-based process for granting permits that, as far as possible, minimizes investor uncertainty and enhances predictability (Söderholm et al. 2015, 140).

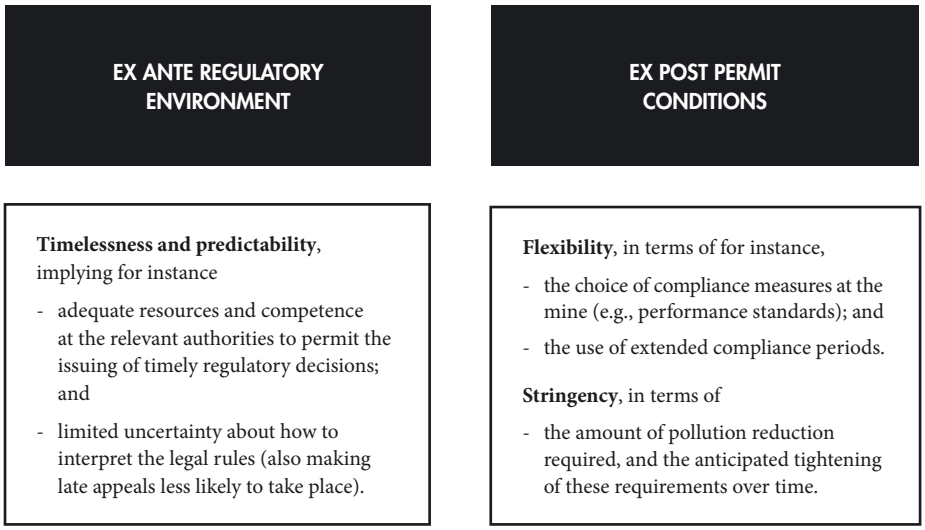

Figure 1. Environmental permits and competitiveness: Critical issues (Söderholm et al. 2015, 135).

In conclusion, the SUMILCERE study recognized some need for improvement in the Swedish and Finnish permitting processes. The study calls for measures (a) to allocate more resources and competence to the administrative authorities, (b) to introduce new governance and administrative tools for improving cooperation and information exchange between the industry and the authorities, (c) to apply stringent performance standards in a more consistent way but at the same time in combination with extended compliance periods, and (d) to introduce more standardized procedures and road maps for EIAs and permit applications as well as for interpreting specific legal rules. These general recommendations are likely to prove fruitful in other developed mining countries as well (Söderholm et al. 2015, 140).

In the case of a sustainable mining industry, economic and environmental considerations form an intricate web. Oversimplification and inaptitude in the clarification of legislation may lead to perverse results. If, for example, the so-called reduction of administrative burdens on industry leads to weaker monitoring and enforcement by the environmental authorities after saving labour costs in administration, the result can be slower administrative decisions and processes. Where this occurs, the "clarification of legislation" ultimately decreases the competitiveness of the mining industry and the amount of foreign direct investments. In fact, a sustainable mining industry can be competitive with strict environmental standards when the regulatory framework is predictable and stable, flexible as regards compliance, and sufficiently consistent without compromising environmental protection for future generations.

ENVIRONMENTAL INFORMATION, PUBLIC PARTICIPATION, AND SOCIAL IMPACTS IN THE ENVIRONMENTAL IMPACT ASSESSMENT OF MINING PROJECTS

Environmental impact assessment (EIA) is a central policy tool for sustainable development (Wilkins 2003, 413; Kokko 2008, 9). Sweden, Finland, and Norway – all Nordic countries – share the same international background as regards EIA regulation. As members of the EU (Finland and Sweden) or the European Economic Area (EEA) (Norway), the three countries all have implemented the EIA Directive. Together with the EU they have also ratified the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention 1991). Russia has EIA legislation of its own and is a signatory to the Espoo Convention but has not ratified it (Koivurova et al. 2014, 46). An obligatory EIA can provide a framework for public participation and, in principle, also for assessing social impact and balancing out asymmetric informa-

tion about a mining project before administrative decisions are made (Söderholm et al. 2015, 135; Kokko 2013, 296).

Environmental sustainability is the objective at issue when an EIA collects environmental information for project planning and administrative decision making. The main informational sources in the EIA procedure are the project developers, who are in charge of collecting environmental information, for example with the aid of private environmental consulting companies. The opinions of the public concerned and the statements of municipalities, other public authorities, or experts can also provide information for the coordinating and other public authorities. The quality of information can be tested in discussions during the compilation of the EIA as well as by public authorities for example. In the Finnish EIA procedure it is the coordinating authorities' task to ensure the quality of the information in the EIA reports (Kokko 2013, 296).

The environmental information in EIA reports is not mere data; it also constitutes evidence put forward by project developers that seeks to convince public authorities and the public that the environmental impacts will remain within the limits set by environmental regulations (Kokko 2013, 296). In this light, one might ask how the EIA procedure, even with public participation and EIA documents, can reduce information asymmetries between project developers and the administrative authorities in the case of issues such as industry-specific pollution abatement technology. The role of the EIA as an information source in permitting also depends on how it is connected to the permit procedures. In Finland, for example, EIA is still a separate, obligatory procedure that provides at least two possibilities for public participation and two EIA documents to be taken into account by the permit authorities, while in Sweden EIA is directly integrated into permit procedures (Pettersson et al. 2015, 243, 246, 251). If regulations are to foster continuous environmental improvements, reducing informational asymmetry is an important consideration. This is especially the case where regulatory stringency has a dynamic perspective, as recommended by the SUMILCERE study in the context of Porter's criterion, mentioned above (Söderholm et al. 2015, 134–135).

When a proposed mining activity is likely to have significant transboundary effects, the nationally regulated procedure for studying the social and environmental impacts usually includes an international hearing. In a transboundary context, the Espoo Convention is the main international instrument that applies to the countries studied in the North Calotte/Kola Peninsula area. Of the focal states, Sweden, Finland, and Norway are parties to the Convention; the Russian Federation has signed the

Convention but not yet ratified it. Hence, if a proposed mining activity is likely to cause transboundary impacts between these three parties, a transboundary EIA procedure must be organized. Although Russia is not legally obligated to organise such a procedure, it is of course desirable to have such a procedure in place. Moreover, the Guidelines for Environmental Impact Assessment in the Arctic, as well as the more general guidance of the International Association for Impact Assessment (IAIA), provide important recommendations on how to conduct more effective and equitable transboundary EIA in the region (Koivurova et al. 2014, 46). Drawing on these and certain other international documents, as well as on the case studies conducted as part of the project, SUMILCERE has produced a guidebook of its own on how to carry out effective transboundary EIA at the beginning of mining projects in the North Calotte/Kola Peninsula region (Koivurova et al. 2015b). One particular instance of best practice for transboundary EIA identified in SUMILCERE case studies was that seen when Sweden and Finland, upon a request by Finland, carried out a joint environmental impact assessment of the Kaunisvaara mining development (Koivurova et al. 2014, 60).

Social sustainability is also a key factor for the development of the mining industry (Suopajärvi et al. 2015, 1). Environmental impact assessments in the countries studied differ both in scope and in their requirements when it comes to assessing the social impacts of mining projects. However, before describing the relevant SUMILCERE studies, it should be pointed out that social effects are understood variously in different circumstances. According to the International Principles for Social Impact Assessment, such effects are intended or unintended social consequences, both positive and negative, of planned interventions (policies, programmes, plans, projects) and any processes of social change initiated by those interventions (Vanclay 2003, 6). Actual social impact on local communities is also related to the very nature of the mining industry. For example, construction and the start of production not only require extensive investments, but also involve a rapid growth spike in the number of employees. The people with the competence required for mining operations may not live in the local community and will thus have to be recruited from the outside (Suopajärvi et al. 2015, 9).

In Finland, Norway, and Sweden, quarries and open-cast mines where the surface of the site exceeds 25 hectares should in practice be assessed using EIA procedures (EIA Directive article 4 (1) and annex 1 (19)). EU Member States should also specify the other circumstances under which extractive industries are subject to assessment (EIA Directive article 4 (2) and annex 2 (2)). According to the Finnish Act on the Environmental Impact Assessment Procedure (EIA Act 468/1994), which implements

the EIA Directive, certain (larger) mining developments fulfil the particular criteria of listed projects and thus fall within the scope of the Act (the EIA Decree 713/2006, section 6). In addition, other mining projects that, after due consideration, are likely to have significant environmental impacts can be required to undergo the EIA procedure (EIA Act, section 4.2).

In Norway, "environmental impact assessment" as defined internationally has its legal basis in the Planning and Building Act (2008). Mining projects fulfilling the particular listed criteria always require an EIA. Smaller projects than those listed can also be assessed using the EIA procedure if, for example, they are located in especially valuable landscapes, natural surroundings, or cultural heritage areas or if they conflict with Sámi nature-based industries or reindeer herding (Planning and Building Act, section 4). In practice, most economically viable mineral projects will be of such magnitude/character that they require an EIA (Buanes 2014).

In Russia, most mining projects do not fall within the scope of the country's EIA legislation. Earlier, the relevant procedure had two stages: an environmental impact assessment with a public hearing and an environmental expert review. Both of the stages were required by the Federal Law (No. 174-FZ dd. November 23, 1995) "On Environmental Expert Review" sometimes also called "On Ecological Expertise". Later, pursuant to the federal law (No. 232-FZ dd. December 18, 2006) which amended Law No. 174, the general list has been sharply reduced, and most mining projects have been excluded from the scope of the law. For example, the law can be applied in cases where the mining project is located on the continental shelf, in the country's Exclusive Economic Zone, in the national waters of the Russian Federation, or when it affects conservation areas. However, the provisions of the Law on Environmental Expert Review do not apply to the overwhelming majority of mining projects. Since the law came into effect, only a general expert review conducted by the state has been required for these projects. Expert reviews should consider environmental issues, but no EIA and public hearings on its results are required (Pettersson et al. 2015, 250). Thus, in Russia an improvement in the EIA legislation is needed in regard to both the scope of EIA procedures and public participation in mining projects.

In Sweden, EIA is integrated into the different permit procedures. The EIA procedure for a new mine in Sweden differs between the two main permits that must be obtained in order to take a mine into production. The main legal acts are the Minerals Act (1991:45) and the Environmental Code (1998:808). An EIA is not usually required

in order to apply for a permit for exploration work. However, if the work includes test mining with an environmentally hazardous activity as described in the Environmental Code, an EIA must be carried out before an environmental permit can be applied for. The Minerals Act, chapter 4, section 2 requires that an EIA be submitted as part of the application for an exploitation concession (mining permit) from the Mining Inspectorate.

Environmental impact can be understood as it is defined in article 3 of the EIA Directive, that is, as the direct and indirect effects of a project on the following factors:

a human beings, fauna, and flora;
b soil, water, air, climate, and the landscape;
c material assets and the cultural heritage;
d the interaction between the factors referred to in points (a), (b), and (c).

However, does this definition include social impact? In the Finnish implementation of the Directive, "environmental impact" is taken to mean direct and indirect effects of a project or operation, on and outside Finnish territory, on:

a human health, living conditions, and amenity;
b soil, water, air, climate, vegetation, organisms, and biological diversity;
c the community structure, buildings, landscape, townscape, and the cultural heritage;
d the utilisation of natural resources; and
e interaction between the factors stated in points a–d above
(EIA Act 468/1994, section 1).

Under the Finnish definition of effects, social impact, as a concept, falls under point a. However, the importance attached to social effects in the EIA procedure needs to be substantially increased. Moreover, social impact assessment (SIA) should be considered as a separate part of EIA and as a tool for voluntary self-regulation in mining companies, one that should be located, in different phases of mining projects (Kokko et al. 2014, 21, 38–39). SIA based on voluntary self-regulation can have broader content than that required in the obligatory EIA process. For instance, during the EIA process for the Hannukainen project, Northland Mines also carried out an SIA. It was a normal procedure in the international context of the industry, but the scope of the assessment in the case of Hannukainen was not required by Finnish law. The company reported that it would include the monitoring of social impacts in its monitoring plan

of the environmental permit. The EIA included the obligatory hearing procedure, but at stakeholders' request the company also held information meetings (Nystén-Haarala et al. 2015, 57).

Although environmental impacts loom large on the list of considerations that should be included, it should be noted that the Norwegian term for EIA is the broader "impact assessment", which encompasses both environmental and social conditions (Buanes 2014). Thus, in principle the interpretation of the term "assessment" leaves some room for analysing social impacts in the obligatory EIA process. However, voluntary and complementary SIA is needed where the legislation has no clear provisions making it mandatory.

In Russia, the EIA regulation does not require a special study of a project's social impacts, but it does include requirements involving some elements of SIA. These relate only to those socio-economic impacts of planned activities that result from the effect of the projects on the environment (Buanes 2014). Hence, SIA is mainly a matter of self-regulation.

The Swedish EIA process has traditionally focused on the biophysical aspects of the environment, while the Environmental Code provides for a wide definition of "environment", one including socio-economic as well as cultural elements. Although an SIA is only allowed – not clearly required – by law, its popularity appears to be increasing voluntarily. Thus, some companies conduct SIAs on their own initiative, while others do not. This creates an unequal situation for some of the communities affected by mining operations (Pettersson et al. 2014, 238).

Social impact assessment is more than a facet of the obligatory EIA procedure. Minimum-level EIA in mining projects does not give any guarantees to the mining companies that their projects have earned acceptance by local communities. As Bastida (2006, 405) remarks: "Difficulties are compounded if the limited staff and resources available to deal with and decide on environmental impact assessments of mega-projects and the limited administrative time they have to study and take decisions on them, are taken into account". The same kind of conclusion has been reached in the SUMILCERE study on environmental permits: "For mining companies it has over time become increasingly important to acknowledge that the permitting process must take a certain amount of time in order to establish good relations with local stakeholders and address any related concerns." (Söderholm et al. 2015, 140). Generally speaking, it is not sufficient for social acceptance that mineral rights and the relevant environmental permits and authorizations for operating are granted, that an agreement is made with

the landowner, or that other mechanisms provided by the law to enter the land are invoked (Bastida 2006, 404–405). Thus, self-regulation is needed on the part of mining companies whereby they conduct social impact assessments and ensure the interaction with local communities that is necessary to earn social licence to operate throughout the lifecycle of mining projects.

SOCIAL LICENCE TO OPERATE AND OTHER FORMS OF SELF-REGULATION AS THEY RELATE TO ACCEPTANCE OF MINING PROJECTS

The term "social licence to operate" (SLO) has several conceptual roots. Sustainable development is among them, as is corporate social responsibility (Koivurova et al. 2015c, 3–5). The latter is widely understood as the World Business Council for Sustainable Development (2015) has defined it: "the continuing commitment by business to contribute to economic development while improving the quality of life of the workforce and their families as well as of the community and society at large" (Riabova and Didyk 2014, 2). When a mine is in operation, social impact assessments should be made regularly and with rather consistent content to get reference data on the various phases of the mining.

Social impact assessment can be used to analyse the acceptability of a mining project among the local community. Thus, rather than viewing SIA merely as a component of the EIA procedure, assessments of the operation phase of a mine should focus on how the terms of "acceptability" (Kokko et al. 2014, 39–40) – and information gained from an SIA about those terms – form the conceptual basis for a SLO.

According to the pyramid model proposed by Thomson and Boutilier (2011), the lowest level of social licence is withheld or withdrawn licence and the highest psychological identification; between them lie acceptance and approval. The levels of SLO represent how the community views the company (Boutilier and Thomson 2011, 2). The normative components (legitimacy, credibility, and trust) serve as the boundary criteria when the levels are distinguished (Boutilier and Thomson 2011, 2; Riabova and Didyk 2014, 3). A recent breakdown of SLO into levels as an arrowhead comprises economic legitimacy at the base; socio-political legitimacy and interactional trust in the middle tier; and institutionalized trust as the highest level (Boutilier and Thomson 2011, 5; Williams and Walton 2013, 4). Riabova and Didyk (2014) took this conception of SLO as the basis for the SUMILCERE case studies of two mining and processing companies operating in the Kirovsk and Apatity municipalities of the Murmansk region in Russia (see Table 1).

LEVEL AND LABEL	DESCRIPTION	ROLE IN DETERMINING SLO LEVELS*
1. Economic legitimacy	The perception that the project/ company offers a benefit to the perceiver.	If lacking, most stakeholders will withhold or withdraw SLO. If present, many will grant an acceptance level of SLO.
2a. Socio-political legitimacy	The perception that the project/ company contributes to the well-being of the region, respects the local way of life, meets expectations about its role in society, and acts in accordance with stakeholders' views of fairness.	If lacking, approval level of SLO is less likely. If both this and interactional trust (2a & 2b) are lacking, approval level is rarely granted by any stakeholder.
2b. Interactional trust	The perception that the company and its management listen, respond, keep promises, engage in mutual dialogue, and exhibit reciprocity in their interactions.	If lacking, approval level of SLO is less likely. If both this and socio-political legitimacy (2a & 2b) are lacking, approval level is rarely granted.
3. Institutionalized trust	The perception that relations between the stakeholders' institutions (e.g., the community's representative organizations) and the project/ company are based on an enduring regard for each other's interests.	If lacking, psychological identification is unlikely. If lacking but both socio-political legitimacy and interactional trust are present (2a & 2b), most stakeholders will grant approval level of SLO.

* as described in Thomson and Boutilier's pyramid model

Table 1. Four factors constituting three levels of SLO (Boutilier and Thomson 2011, 4; Williams and Walton 2013, 4).

The concept of an informal social licence is probably, as Thomson and Boutilier state (2011, 1780), "comfortably compatible with legal norms in the countries that operate under the principles of common law". The research done as part of SUMILCERE focused particular attention on Thomson and Boutilier's argument that "the concept runs into difficulties" in countries with legislatures operating under the principles of civil law (ibid.); this can be confirmed to some extent in the case of Finland, Russia, Norway, and Sweden (Riabova and Didyk 2014, 4).

The difficulties are related to the legal norms (culture) in these countries, which prescribe that only the official public authorities can grant an (administrative) licence, and thus many companies equate that licence with formal permission to operate. For example, in Norway, due in large part to the stringent regulatory arrangements, SLO as a term has not yet entered the mining discourse; the logic still seems to be "if a company follows the formal rules, it is then seen as fulfilling its duties also toward the local community" (Koivurova et al. 2015c, 8). However, the granting of SLO is not, and could not even be, an aspect of obligatory administrative regulation governing the legal relationship between a company and the public authorities; rather, SLO involves voluntary self-regulation on the part of a company as regards its social relationship with the local community.

Incentive to use SLO comes partly from the financial sector, for example in the form of the Equator Principles (III – 2013). As a tool of that sector, the main premise of SLO is that both financing and lending companies are privately owned. However, in the Nordic countries and Russia the state may be a shareholder in a (totally or partly publicly owned) mining company, and thus the operating company does not necessarily need funding from the private financial sector. In such cases, other possible incentives should be strong enough to prompt mining companies to use SLO as part of their self-regulation.

The SUMILCERE case studies in Russia show that SLO is not a familiar concept in the country, whereas the concept of corporate social responsibility (CSR) – one of the pillars of the concept of social licensing – is used widely. The main motives for the mining companies' social activities include a desire to project a good image to the authorities at all levels (federal, regional, and local) and to the local community; the desire to establish a good reputation in the domestic and international business arenas; the desire to support the town that is home to the company's employees (as the case of the Apatit company demonstrates); and the long-standing tradition, going back to the Soviet

era, of CSR (Riabova and Didyk 2014, 9; Koivurova et al. 2015c, 19–20 and 24–25). The last of these, known as path dependence, is also strong in the Swedish mining industry (Pettersson et al. 2015, 252), whereas in Finland, especially in the northern parts of the country, domestic mining companies ceased operations almost completely during economic crisis in the 1990s. The mining industry has only recently started again with multinational companies entering the industry (Heikkinen et al. 2013, 2; Nystén-Haarala et al. 2015, 53).

One SUMILCERE case study on six different mining companies in Finland, Russia, and Sweden shows that adjustment to local circumstances is emphasized in the mining sector of the Kolarctic area. Taking into account local circumstances means not only that an international company has to adjust to national regulation, but that it has to go further with self-regulation, network itself with local businesses and meet the needs of all kinds of stakeholders. Mining companies like to emphasize the role of their own policies and abilities to cooperate, although they may borrow some examples from other companies' and global standards (Nystén-Haarala et al. 2015, 62–63).

In fact, speaking of a social licence as granted by a community is a simplification of a more complex situation, one marked by different political interests. In addition, local communities vary and have their own expectations of cooperation with mining projects for socially sustainable development. Thomson and Boutilier prefer to speak of stakeholder networks rather than communities and have adopted a definition of stakeholders as those who could be affected by the actions of a company or who could have an effect on a company (Boutilier and Thomson 2011, 2). Our research focus, however, has been on local communities in a generic sense.

Another SUMILCERE study has identified four main themes relating to local communities. First, the conditions for social sustainability are met if the living environment remains enjoyable and safe; this shows a particular concern for people living in close proximity to the mine. Second, a project is felt to have social sustainability if continuous, open, and reliable information about environmental monitoring is reported to the local community. Third, the mining company should be seen as acting transparently and engaging in a dialogue with different interest groups so that their concerns are identified and met. Finally, local communities are seen to benefit from the mining industry such that environmental justice is realized. Local expectations of the mining companies are that the mines should operate on a solid economic foundation and that

the companies should manage environmental risks, because materialization of risks is seen as a burden for coming generations. Thus, from the local perspective, the interconnectivity of environmental, economic, and social sustainability is underscored (Suopajärvi et al. 2015, 13).

PROTECTION OF SÁMI CULTURE IN MINING PROJECTS

An important part of social sustainability is the protection of the cultural and other rights of the Sámi, an indigenous people living in the European High North and often referred to as "one people" in four countries. One of the SUMILCERE studies focused on the Sámi, examining how their rights as a people are protected against adverse impacts of mining activities and how national legislation and, in particular, mining codes take cultural rights and traditional livelihoods into account. The research focuses on the legal protection of reindeer herding (Koivurova et al. 2015a, 12).

The term "livelihood" refers to activities that involve primary production as the source of income. While traditionally the Sámi have pursued a variety of nature-based livelihoods connected to their lands and territories, such as fishing, small-scale family forestry, agriculture, gathering of wild berries and other natural products, as well as handicraft-like manufacture of traditional articles, the most common means of livelihood has been semi-nomadic reindeer herding. The traditional livelihoods of the Sámi, especially reindeer herding, enjoy various kinds of protection in the four respective legal systems. The protection of Sámi traditional livelihoods takes place via different legal means in the different systems (Koivurova et al. 2015a, 12, 15; Kokko 2010, 265–267).

A realistic view of Sámi livelihoods and, for example, reindeer herding, reveals stark differences between the four legal systems as to how much protection they provide for Sámi traditional livelihoods against adverse mining impacts. Closer analysis shows limits in protection. In Finland, for example, the protection of Sámi reindeer herding is closely related to the cultural protection which the Sámi homeland region enjoys. It is Sámi reindeer herders in the Sámi homeland who enjoy the most protection from adverse impacts of mining (Koivurova et al. 2015a, 19).

In Sweden and Norway, reindeer herding is based on customary law and can be practised only by Sámi. Yet, even though reindeer herding enjoys this protection, its legal protection differs in Norway between different regions. The protection of Sámi inter-

ests in Finnmark seems to be the strongest. Reindeer husbandry in Norway enjoys fairly strong protection, guaranteed by ILO Convention no. 169 not only within the Finnmark area, but also in other relevant territories. Since reindeer herding is practised over vast tracts of land in Sweden, land-use conflicts inevitably arise, as mining interests are protected as well. Swedish land and water areas that contain valuable minerals enjoy the same kind of protection as those used for reindeer herding. Areas can thus be of local as well as national interest for both activities, in which case the activity that best promotes sustainable development should be "granted" the area (if a combination of uses is not possible) (Koivurova et al. 2015a, 15–16, 23). When mining gets priority, a discussion usually ensues about compensation for reindeer husbandry. The mining company LKAB, for example, has established steering committees with Sámi villages for that purpose relating to the Gruvberget and Mertainen deposits (Nystén-Haarala et al. 2015, 55).

If mining rights supersede traditional Sámi livelihoods that are based on the Sámi people's cultural rights, mining companies can make private agreements with Sámi communities and/or reindeer herders for earning SLO. These kinds of private contracts can be viewed as voluntary company-based self-regulation and they form an alternative legal tool to obligatory legislation on compensation for damage (Nystén-Haarala et al. 2015, 62–63).

In Russia, indigenous Sámi traditional livelihoods are given strong protection in principle. Reindeer herding, as a branch of agriculture, is regulated by the relevant legislation. However, according to Professor Vladimir Kryazhkov, the Russian legislation is immensely inadequate when it comes to relations between mining companies and numerically small indigenous peoples in practice. The SUMILCERE study on Russia shows that in fact "Russian mining legislation does not regulate Sámi relationships and these issues are regulated by special federal legislation. In general, the Sámi consider federal legislation to be sufficient, but they note that local legislation works poorly in practice". When discussing Russian Sámi livelihoods, it is crucial to mention the obshchina, a traditional form of organization for indigenous peoples in Russia that allows them to revive and develop their culture, traditions, and traditional nature-based livelihoods (Koivurova et al. 2015a, 14, 22, 41).

In Russia there may be historical reasons preventing compensation being given to Sámi people for harm to cultural rights. For example, in the 1920s the Apatit mining company began operations in the Khibiny Mountains, which are considered sacred by

the Sámi. Around that same time, however, the nomadic Sámi of the Kola Peninsula were resettled in several villages as part of a forced collectivization, the result being that they no longer live in the area where the mine operates. During the Soviet era, it was impossible for the Sámi to get any compensation for harm to reindeer herding as a traditional livelihood. The Sámi living in the towns of Apatity and Kirovsk today are not entitled to compensation either, because they have not continued their traditional way of living, which is a requirement under Russian law if indigenous peoples are to receive any special economic rights (Nystén-Haarala et al. 2015, 59).

The SUMILCERE studies show that the legal protection that the Sámi people now enjoy against mining and its adverse impacts is relatively strong, although very different in the four countries with Sámi populations. The effectiveness of protection was tested and compared by conducting interviews with mining companies, consultants, authorities, experts, and representatives of the Sámi. Obviously, none of the legislation in the four countries is what might be considered ideal, whereby one can hardly decide which gives the most protection (Koivurova et al. 2015a, 42). Clearly, improvements in the law and company self-regulation are still needed to reconcile the economic interests of the mining industry with indigenous rights in a socially sustainable way. An important initiative in this regard is the Nordic Sámi Convention.

CONCLUSIONS

Sustainable mining is an objective as well as a tool for balancing economic, social, and environmental considerations. Each of these three dimensions of mining – and sustainable development – has many components, some of which were chosen for closer study in the SUMILCERE project. While there is no single component that in itself provides a definitive argument for or against sustainable mining, the research has revealed some that have proven valuable in the process of balancing the different dimensions of sustainability.

This hermeneutic process can be described using the sustainable development circle (Figure 2). In the centre of this circle is public participation for identifying the different components and balancing the different aspects of sustainability. In empirical studies, local people underscored the interconnectivity of environmental, economic, and social sustainability. Local residents – the public – can bring in new information about local considerations during participation arranged by the mining companies as required by regulation and/or as part of voluntary self-regulation.

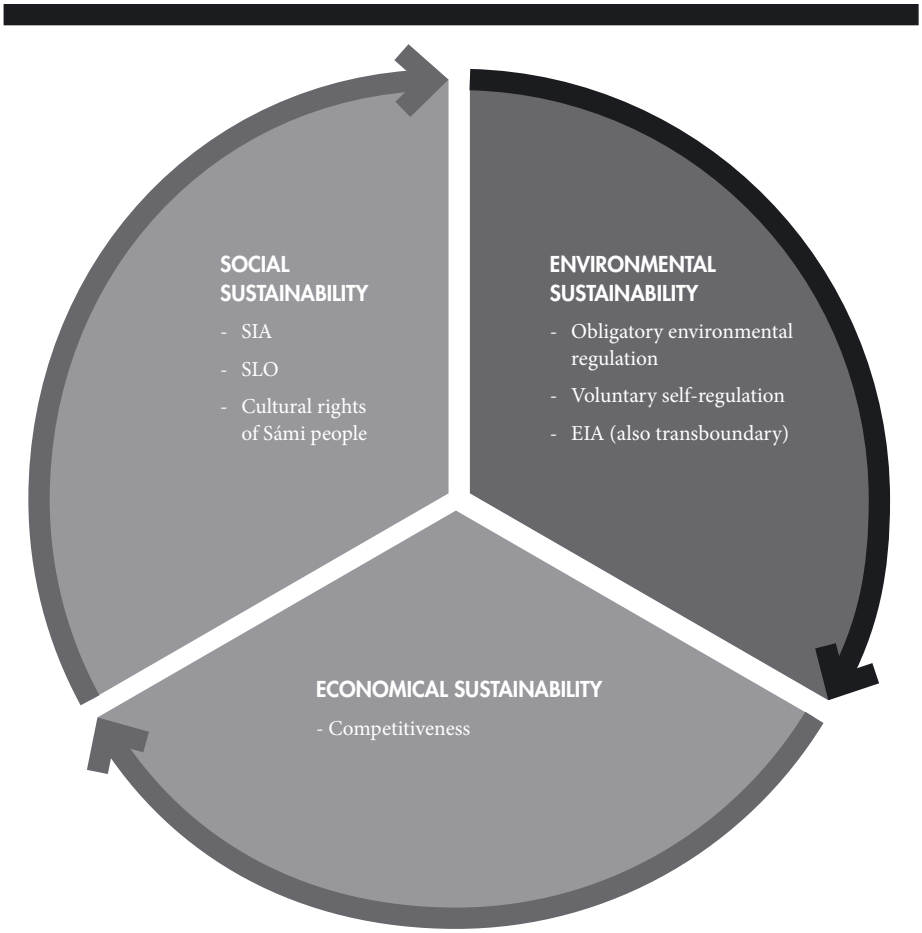

Figure 2. Sustainable development circle.

Public involvement before and during mining projects also affords mining companies an opportunity to increase trust and acceptability among local communities and thus to earn an SLO. The concept of SLO is not yet well known in the countries studied. Only in Finland has there been some discussion about the use of SLO. CSR is, however, a better-known concept in mining companies, and public participation is also a tool of CSR.

SLO cannot be seen simplistically as merely a matter of acceptance by people at the local or even national level. In fact, it is fundamentally a tool for self-regulation of a three-way relation: that between the mining project developer, the financing sector, and the local communities. The fundamental idea behind SLO is that the private financing sector needs

guarantees of local acceptance of private projects in order to minimize social risks to its funding. If a particular mining project, and the responsible company, has not gained local acceptance, it is not possible, or at least not easy, to get private funding for operations in that area. However, this kind of financial incentive for earning local acceptance may not function if the state is one of the mining company shareholders. In Finland, Russia, and Sweden the states actually have the role of shareholder in some mining companies. The state's role can constitute a factor in project financing, which, in addition to some of the above-mentioned legal and cultural considerations, may diminish the use of SLO as a self-regulation tool in these countries alongside the widely known CSR.

The weight of the different factors constituting sustainable development varies in different circumstances. Sometimes ecological or cultural considerations, for example, can be so significant that there is no room for mining. Sometimes the mineral resource can be so rich that other aspects of sustainability receive lesser weight in the balancing of sustainability dimensions. In the SUMILCERE project the aspects of social sustainability given closer scrutiny were SIA, SLO, and the cultural rights of the Sámi. Economic sustainability was analysed in the light of competitiveness and environmental regulation. Possibilities to promote environmental sustainability were canvassed from the obligatory regulation and self-regulation; they have also been identified in the policy instruments, in EIA, and in environmental protection permits. When the policy instruments were analysed in greater depth (Table 2), particular issues could be found in their implementation that may expedite or hamper mining activities in making progress towards sustainability.

Table 2 clearly indicates some need to improve policy instruments. The current environmental/mining regulation and its enforcement may limit some possibilities for sustainable mining. SIA, for example, could be better regulated in all the countries studied.

Although public regulation is assumed to be a more effective way to control environmental pollution than private-law instruments (Faure 2012), private law and self-regulation can, in fact, round out the regulation found in public law. For example, private agreements with Sámi communities and/or reindeer herders were seen as useful

Table 2. Implementation for sustainable development of some policy instruments studied.

	FINLAND	NORWAY	RUSSIA	SWEDEN
EIA	National legislation based on EU EIA Directive and ratified Espoo Convention	National legislation based on EU EIA Directive and ratified Espoo Convention	National legislation (signatory of but has not yet ratified Espoo Convention)	National legislation based on EU EIA Directive and ratified Espoo Convention
Scope for mining	Yes	Yes	Limited to some valuable areas	Yes
Transboundary assessment	Obligatory	Obligatory	Voluntary	Obligatory
SIA as a part of obligatory EIA	Yes, quite limited	Yes, although open to interpretation	Unclear	Unclear
Wider SIA voluntarily as a part of EIA	Yes, done	Possible	Possible	Possible
Public participation	Yes	Yes	Limited	Limited in some processes
Environmental permit	National legislation based on EU Industrial Emissions Directive	No analysis (no Norwegian legal scholars involved)	National legislation	National legislation e.g. based on EU Industrial Emissions Directive
Performance standards	Yes	No analysis	Yes	Yes
Public participation	Yes	No analysis	Limited	Yes
Coherence and consistency with other environmental regulation	Improvements needed	No analysis	Improvements needed	Improvements needed
Enforcement and competitiveness	Certain and quite clear but could be more flexible in the case of compliance	No analysis	Administrative uncertaities are weakening compliance	Certain and quite clear but could be more flexible in the case of compliance

instruments in determining compensation even in cases where public law had some regulation for the purpose. Likewise, the FSC standard in the forest sector is a good example of how NGOs and companies can cooperate and share responsibility. At least in Finland, one hears discussion by the Network for Sustainable Mining that cooperative self-regulation should be strengthened in the mining sector.

With regard to competitiveness, the SUMILCERE study calls for four improvements in environmental/mining regulation and management:

a improved resources and competence of the authorities,
b new governance and administrative tools,
c stringent performance standards in combination with extended compliance periods, and
d more standardized procedures and road maps for EIAs and permit applications and for the interpretation of specific legal provisions.

When considering social and cultural sustainability in mining projects in the countries studied, in principle Sámi cultural rights are quite well protected in legislation. However, in practice particular problems appear in enforcement. Thus, improvements are still needed in both the environmental/mining regulation and management. In addition, it is hoped that self-regulation by mining companies will introduce new tools for taking cultural rights into account as part of CSR.

Sustainable mining calls for balancing economic, social, and environmental factors when seeking the best environmental regulation and practice. Between the dimensions of sustainability lies a grey area for balancing the factors against each other. However, ecological sustainability protected by smart environmental regulation and minimum standards sets an essential boundary that leaves no space for compromises without endangering the whole idea of sustainability. Economic and social sustainability are ultimately possible only within ecological limits. In this synthesis, particular components of sustainable mining have been described based on the results of the SUMILCERE project. Details of the analyses in the Kolarctic area and accounts of the methods used can be found in the cited articles. Moreover, the separate SUMILCERE toolkit collects and introduces some examples of best practices. In general, the SUMILCERE studies show that all aspects of sustainability are deeply interconnected in terms of SIA, SLO, CSR, and the cultural rights of Sámi as well as in the policy instruments relating to environmental regulation.

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