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Lithium Mining as a Tool for Economic and Energy Transformation of Region: Reflections on Policies, Processes and Communities

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ABSTRACT

This article deals with examining the impacts of planned lithium mining in the territory of the Czech Republic. With the increasing demand for lithium for use in green technologies - such as electric batteries and energy storage systems, the scope of mining operations is expanding, raising questions about sustainability and social impacts. This article thoroughly explores both the economic benefits and the negative effects on local ecosystems and communities, using the example of one of the largest lithium deposits in Europe. This article looks at the preparation and pre-opening process and what the attitudes of residents and political leaders are towards the start of mining. The article also evaluates regulations, including the necessary studies assessing the environmental impact of mining on the region, to determine whether lithium mining will bring more positive than negative outcomes for the area's development. The results indicate that while there are intentions to regulate lithium mining in order to minimise its negative impacts and promote economic development, the practical implementation and communication of these intentions at a local and regional levels is not very effective.

Keywords: Lithium, Mining, Region, Policy
JEL Classifications: O18, Q48, R11

1. INTRODUCTION

In recent decades, lithium has become an essential element in the technology industry, particularly in battery production (Tarascon and Armand, 2001) and for other high-tech green applications (Reich, 2008; Tarascon, 2010; Ziemann et al., 2012; Manthiram et al., 2017). Lithium's use in supporting green technologies such as electric cars and renewable energy storage systems highlights its increasing importance in the global transition to more sustainable energy solutions. Energy storage with battery storage using lithium has lead to the development of new technologies (Després et al., 2017) for energy storage (Sioshansi et al., 2012) and the development of smart grids (Cai et al., 2020) to maintain the stability of the electrical grid. The ability of lithium to store energy during periods of low production and release it during peaks in demand is key to modern energy grids (Tarascon and Armand, 2001). In the field of consumer electronics, lithium enables the development of lighter, more compact and high-performance devices and its ability to charge quickly and provide stable performance at high energy density has made it the standard for portable electronic devices (Gajardo and Redón, 2019).

In order to fully realise the potential of lithium to power a clean energy future, it is essential that integrated strategies are developed including responsible mining practices, investment in technological innovation and robust global market regulation, as lithium will remain a driver of sustainable development in the energy sector (Kavlak et al., 2018). This rise increased the demand for lithium, leading to the expansion of mining operations worldwide (Dorn and Peyré, 2020; Glazyrina and Latysheva, 2021). Lithium-ion batteries are capable of storing a significant amount of energy in a compact form, they are the basis of the current generation of electric and hybrid vehicles (Gruber et al., 2011; Tran et al., 2012).

Lithium mining is becoming a focus around the world, especially the transition to renewable energy sources (Quijano, 2020). However, with the increasing demand for lithium due to the expansion of green technologies, mining operations are also expanding, raising questions about the sustainability and social impacts of mining itself (Petavratzi et al., 2022; Martinez-Fernandez et al., 2012; Suopajärvi et al., 2017). It is therefore necessary to consider the potential negative impacts of lithium mining, including environmental degradation (Langkau and Erdmann, 2021), social and cultural problems (Cheshire et al., 2014) and health risks (Li et al., 2014) associated with exposure to chemicals and pollution. In the surrounding area there may be interventions in its ecosystems, which could be disturbed by the excessive use of water resources needed for mining processes. In addition, it is necessary to take into account the social impacts on local communities, who often feel the negative consequences of mining in their area (Aragón and Rud, 2013; Sahu et al., 2014). Responding to these impacts will require a shift to multilevel governance, which Hooghe and Marks (2003) identify as a flexible framework for engaging a wide range of actors and taking into account both local and global perspectives. Ostrom (2017) in this context emphasises the importance of an integrated approach to managing the impacts of mining operations. This approach recognises that effective adaptation to local specificities and the successful management of common resources is possible without centralised intervention, as evidenced by historical and contemporary examples.

These factors can overshadow the positive benefits and raise the need for a sustainable approach and planning to minimise negative impacts and to confirm that lithium mining will be beneficial to communities. The development of lithium mining should therefore be managed in a sustainable way which respects the rights and needs of local residents (Martin et al., 2017). The question of whether lithium mining will bring more positives than negatives for the development of municipalities is therefore complex and requires careful consideration of all aspects and the involvement of all stakeholders in the decision-making process. Therefore, two basic questions became the research objective of this article:

a) Does the regulatory and political framework sufficiently reflect the needs of the municipalities within the territory?
b) Will lithium mining bring more pros than cons to the development of the area?

2. THEORETICAL REVIEW

The largest lithium producers are Chile, China, Australia and Argentina. The largest importers of lithium are China, Japan, South Korea and the United States. In recent years, lithium production has been dominated by Australia (e.g. Greenbushes deposits), South America (Salar de Atacama) and China (Zabuye, Qaidam Lakes). Thus, of the 36.5kt of lithium produced in 2016, 39% came from Australia, 32.8% from Chile, 15.6% from Argentina and 5.5% from China. In Europe, the largest lithium reserves are in Portugal (1.3% of world production) for the ceramics and glass industries. However, the technology and process of lithium mining and processing is associated with negative impacts on environmental quality, particularly in the areas of landscape degradation, loss of water resources and pollution.

Mining companies often invest in local infrastructure as part of their contracts with local governments or as part of their corporate social responsibility programmes. In addition to direct jobs, lithium mining can lead to investments in infrastructure, schools, and health care, contributing to overall community development (Gris, 2023). According to Facada (2017), there is also an increase in revenue for local governments through taxes and fees and increased support for research and development. As reported by Jerez et al. (2021) in some cases mining companies have diversified their corporate social responsibility (CSR) efforts, which have included initiatives focused on education, social development and heritage conservation. The social impacts of lithium mining include on one hand population growth (Frederiksen and Kadenic, 2020) and displacement of communities, but on the other hand can lead to a disruption of traditional ways of life and social conflict. Lithium mining can also affect the rights and livelihoods of indigenous peoples who rely on traditional uses of land and natural resources. There are a number of other risks, such as conflicts between mining companies and local communities over land use and natural resources, in some cases leading to the displacement of communities without proper compensation. A study by Li et al. (2014) also highlighted the socio-economic impacts of mining, such as land destruction and disruption of traditional ways of life. Ultimately, mining can lead to extensive damage to the landscape (Riofrancos, 2023), loss of natural vegetation cover and disruption of local ecosystems, which can lead to a decline in biodiversity and cause changes in the natural environment. Water and soil pollution from heavy metals and chemicals released during mining processes can contaminate local drinking water supplies and harm agricultural production.

2.1. Lithium Mining: The Momentum for the New Development of an Coal Mining Region

Lithium mining in Europe has been experiencing dynamic development in recent years, mainly due to the increasing use of this metal in electromobility and other green technologies. As part of the assessment of the economic potential of lithium deposits in Europe, the Cínovec deposit in the Czech Republic has been classified as a Category A deposit. This category identifies those sites with a lithium oxide (Li2O) content in excess of 1,000,000 tonnes, representing the largest lithium reserves in Europe. In addition to Cínovec, there are two other sites in this category, namely St. Austell in England and Jadar in Serbia. In contrast, other European deposits have been rated in lower categories, reflecting lower economic viability or more difficult mining conditions (Gourcerol et al., 2019). Another factor that makes Cínovec exceptional is its strategic location within Europe, which allows easy access to European markets. This geographic location makes Cínovec a key player in the supply chain for lithium-based technologies (Gourcerol et al., 2019). These lithium reserves are primarily contained in zinnwaldite, a lithium-rich mineral which is a major component of local granite-greisen systems (Sterba et al., 2020; Molinek et al., 2019; Breiter et al., 2019). This richness in zinnwaldite makes Cínovec one of the largest lithium deposits in Europe. Given the expected increase in demand for lithium, mining capacity is expected to increase which has the potential to make a major contribution to achieving sustainable development goals and reducing dependence on imports from non-European sources (2018; Sousa et al., 2018).

The Ústí region is a region dominated by coal mining and heavy industry. The gradual disappearance of this important part of the region's economy requires restructuring and the creation of new industries. One of the potential directions is the opening of lithium mining, which offers promising opportunities in view of growing demand and the development of new industries. Figure 1 describes the ongoing process of the restructuring of the region and the transformation which can be triggered by the transition from coal mining to the formation of a new economy based on the use of mined lithium within the setting of conditions in the legal and regulatory framework of society. This transition can be interpreted in the context of selected dimensions. Coal mining region is characterised by a complex lock-in of development processes, manifested in high environmental pollution within the territory, an uncompetitive economy and weak research potential. The result is high structural unemployment and a lack of new firms in growth sectors. Lithium mining, on the other hand, should be linked to maximising the effects that new resources can bring.

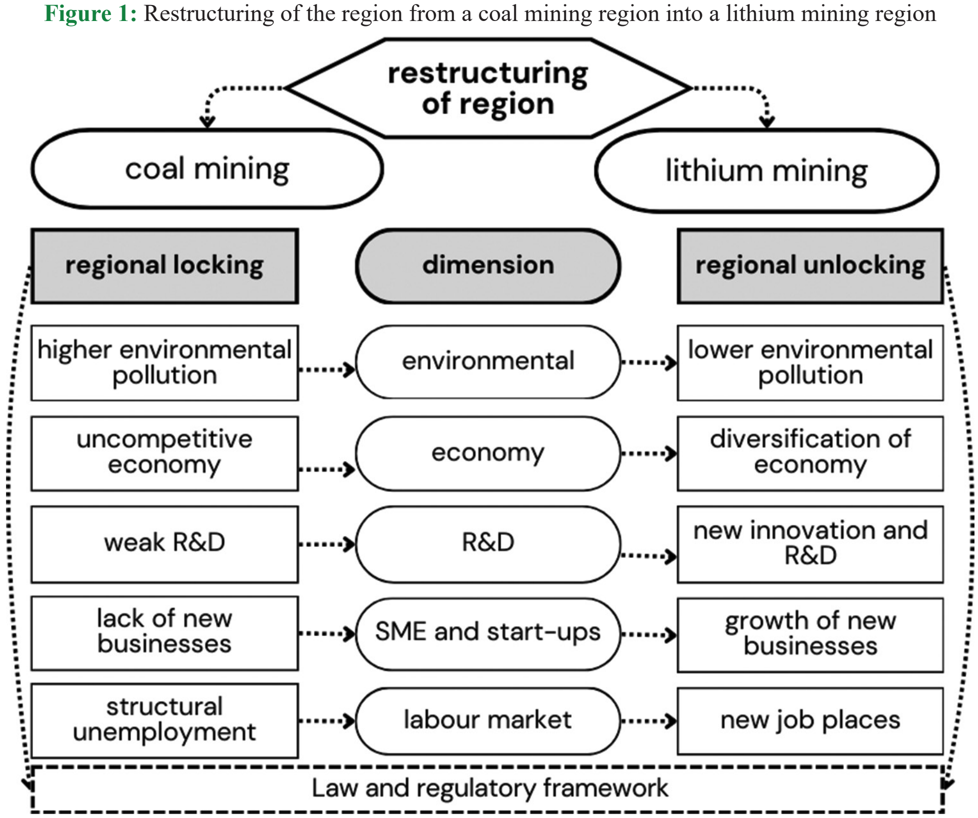
Restructuring is key to creating new industries and offsetting the losses from coal mining. Dependence on the mining industry in the region has led to locked-in economic development, high structural unemployment and economic instability and environmental stress. The starting of lithium mining therefore offers a significant boost; unlike lignite mining, it will not put as much strain on the landscape, and can diversify the economy by developing new value chains which will also bring business in new sectors. The transition to new industries requires a comprehensive strategy which promotes innovation, investment in research and development and the creation of a favourable business environment. Such a transformation could not only bring economic growth, but also improve the quality of life of the population and strengthen the competitiveness of the region. Acceleration of developmental changes should bring positive changes such as diversification of the economy towards new sectors which will require the generation of new innovations and R&D in battery and battery energy storage production.

3. RESEARCH METHODOLOGY

The research methodology aimed to map all stakeholders and take into account the environmental and social impacts, and in particular to assess regulatory mechanisms as they reflect the attitudes of municipalities and communities affected by lithium mining. The set research methodology should reveal the complex links between lithium mining and its impact on the region, ecology and the economic effects resulting from lithium mining. The research was divided into two dimensions of qualitative and quantitative research. In the second part of the quantitative research, the desk research method was applied and data mining was carried out, while in the second part, key actors were interviewed and their attitudes towards lithium mining were mapped, and the attitudes of actors presented in media articles were researched.

The desk research method was the main tool for collecting, analysing and synthesising existing information and data. The

Figure 1: Restructuring of the region from a coal mining region into a lithium mining region



Source: Own research

advantage of this method was the use of existing data related to development strategies and lithium mining, without the need to create new data from primary research as this is often research based on the analysis of areas associated with lithium mining. Using this method, it was possible to evaluate different perspectives and strategies in national and regional development documents. Together with data mining of other available statistical data from authorities and expertise, including the development of lithium prices on financial markets, it is possible to interpret the collected data to assess the benefits of starting mining and its impact on the region and localities. This step is necessary to gather data and information which provides an overview of the current state and strategic direction of lithium mining. Another part of the quantitative research focused on data mining, which uses national and regional statistics and market research. The market dynamics and economic potential of lithium mining will be evaluated, including demand, supply and price trends of lithium on the global market.

Quantitative methods have made it possible to assess the impact of lithium extraction measurably, while qualitative approaches have provided a deeper insight into the views and expectations of stakeholders. To this end, in the second part of the research, interviews were conducted with key state, regional and local actors (Table 1) who make lithium extraction related decisions or will be affected by extraction. The research was supplemented by a questionnaire survey in towns and cities around the mining territory of the region and the following table shows an overview of these actors. Part of the qualitative research was a questionnaire survey of residents living in the region where mining is planned. The questionnaire investigation was disseminated through an online social network in groups of interested municipalities. Here, 251 respondents participated in the investigation. Another element of the research was the analysis of the legal and regulatory framework, creating conditions for the preparation and discussion of mining with interested actors from national, regional and local levels.

4. RESULTS

4.1. Regulatory Framework at a European Union Level

The European Green Deal is a European Union initiative aimed at transforming the EU into a modern, efficient and competitive economy with the goal of achieving zero net greenhouse gas emissions by 2050. It promotes resource-agnostic economic growth and ensures that no one is left behind. It is a comprehensive strategy which includes investments of €1.8 trillion from the Next Generation EU recovery plan and the EU's 7-year budget to finance the green transition. The EU is putting in place regulations on lithium mining and exploitation through various legislative frameworks aimed at environmental protection, recycling and sustainable development. These frameworks include the EU Regulation on Batteries (European Parliament, 2023), which emphasises ensuring the collection, reuse and recycling of batteries in Europe. The main objective is to ensure that batteries have a low carbon footprint, contain minimal harmful substances and are mostly collected and recycled, with a minimal use of raw materials from non-EU countries. These steps are aimed at supporting the transition to a circular economy (Garcia et al.,2023), increasing the security of the supply of raw materials and energy and strengthening the EU's strategic autonomy (European Union, 2019; European Parliament, 2023).

The Waste Directive (European Parliament, 2006) plays a key role in the regulation of batteries and accumulators and waste management of them within the European Union. For detailed information regarding lithium in the context of this Directive, it is important to understand the specific requirements which the Directive places on the material and chemical composition of batteries, which includes restrictions on the use of lithium depending on its environmental impacts and recyclability. The European Union supports investment in sustainable projects through various financial schemes and initiatives, including the European Green Deal and the EU Next Generation Plan. These schemes are aimed at supporting projects which involve the extraction and recycling of lithium in order to support the transition towards a more sustainable and greener economy. The Critical Raw Materials Act (European Parliament, 2019) aims to ensure a safe and sustainable supply of critical raw materials for EU industry, significantly reducing the EU's dependence on imports from other countries. Among the critical raw materials specified are lithium, cobalt and nickel, which are essential for battery production. The Act sets specific targets for increasing domestic capacity in the critical raw materials supply chain: 10% of the EU's annual needs for extraction, 40% for processing and 15% for recycling by 2030. In addition, the Act aims to improve the EU's resilience by ensuring a coordinated effort to build strategic stocks and promoting sustainable investment and trade. Together, these initiatives represent a comprehensive EU approach to managing the supply of lithium and other critical raw materials needed to support green transformation and the digital economy. The EU

Table 1: Overview of interviewed actors

Type of actor	Level	Level	Number of interviews	Position	Interviewed actor
Political Leader	National	NUTS 1	5	Member of the Govern-ment	Ministry of Industry and Trade of the Czech Rep., Ministry of Agriculture of the Czech Rep., Council of the Energy Regulatory Authority of the Czech Rep., University of Ostrava and Technology Agency of the Czech Rep.
	Regional	NUTS 3	1	Governor	Ústí region
	Local	LAU 2	3	Mayor	Mayors in the territory
Private subject	Regional	NUTS 3	1		Exploration licence holder
Citizens	Inter-regional	LAU 2	256	Citizens	Local citizens

Expl: (NUTS 1,2,3, or LAU 1,2) is the Nomenclature of Territorial Units for Statistics (division) and Local Administrative Units (subdivision) as used in the European Union for the statistical monitoring of territories aims to reduce greenhouse gas emissions by 50-55% by 2030 and to achieve climate neutrality by 2050. It is clear that this ambitious target will have a significant impact on the socio-economic fabric of regions where productive activities have previously been based on coal and fossil fuels. The importance of lithium as a key component for electric mobility, which is essential to achieve the EU's emission reduction targets, should be added to this.

The European Union aims to ensure a just transition to a climate-neutral economy through the Just Transition Mechanism (JTM). This mechanism is a key instrument to ensure that the transition to a climate-neutral economy is made in a fair way, without leaving any part of society behind. The JTM provides targeted support to help mobilise around €55 billion over the period 2021-2027 in the most affected regions and mitigate the socio-economic impacts of the transition. The new EU regulatory framework for batteries aims to reduce the negative environmental and social impacts of lithium mining and battery production. It introduces measures such as carbon footprint rules and recycling requirements, which have a direct impact on lithium mining, limiting environmental damage and promoting the recyclability of materials.

4.2. At a National Level in the Czech Republic

Particular attention is paid to projects related to the extraction and use of lithium, an example being the Cínovec project (Geomet, 2021), which has been identified by the EU Just Transition Fund as a strategic project for the Ústí region. This designation enables the lithium project to receive funding from a new EU financial scheme to support regions in the transition to climate neutrality by 2050. From the perspective of the state, and therefore the necessary permitting steps, the instruments used to assess lithium mining are the SEA (Strategic Environmental Assessment) and the EIA (Environmental Impact Assessment) process, with both serving different purposes and neither in a position of superiority. EIA assesses the potential environmental impacts of mining projects and processing plants in detail, while the spatial development principles determine where and how these activities can be implemented within the region. SEA, on the other hand, is the process of assessing the environmental impacts of plans, programmes or policies at a strategic level, before specific projects are identified. This process helps to anticipate and minimise negative impacts on the environment and human health while promoting sustainable development. Together, these two regulatory frameworks ensure that lithium mining is conducted in a manner which minimises negative impacts on the environment and communities, and which promotes sustainable development within the region. The Ministry of the Environment, as the relevant authority, is collecting input from individual stakeholders on this project.

The lithium mining project at the Cínovec site has been allocated support of EUR 49 million within the framework of the Regional Standing Conference of the Ústí region, which is the maximum funding available for each of the strategic projects within the Ústí region. However, the total cost of this project exceeds CZK 11 billion. The intention of the Regional Standing Conference body is to bring together important regional institutions such as the Ústí region, the University and representatives of the Ministry of Regional Development and the Ministry of the Environment. The actual recognition of the possibility of lithium mining as a strategic investment has not yet been decided and is not mentioned in the regional strategic documents. Discussions are currently underway at the level of all stakeholders within the region and the project will be discussed and possibly reconfirmed in June 2024 by all stakeholders within the Ústí region in terms of allocation of subsidy support. The 6th update on the Development Principles of the Ústí region sets specific requirements for minimising environmental impacts. These principles (Czech Environmental Protection Legislation, 1992; Czech Environmental Damage Prevention Legislation, 2008; Czech Government Regulation on Environmental Remediation, 1999) emphasise sustainable development, the protection of natural resources, and careful assessment of potential impacts on workers (Czech Mining Safety Regulation, 1998; Czech Mining Legislation, 1988), local communities and ecosystems. The principles (Czech Construction Legislation, 2006) include detailed land use planning guidelines to ensure that mining projects are aligned with regional development goals.

4.3. Results of the Questionnaire

The questionnaire aimed to determine the attitudes of residents towards lithium mining in the area. Respondents expressed strong negative attitudes towards the impacts of lithium mining on the landscape, environment, air quality and quality of life of residents (Figure 2). The predominantly negative assessments indicate respondents' concerns about potential damage to nature and living standards. On the other hand, a positive point is that respondents rated the impacts on the economic situation in the community and the number of jobs as predominantly positive. However, it is interesting to note that despite the positive perception of economic impacts, the overwhelming attitude of respondents is neutral. The public is concerned about the negative impacts of lithium mining on the environment and the quality of life of residents, but at the same time they recognise the potential economic benefits.

The respondents (Figure 3) answered that they do not support lithium mining (43.8%), with a higher proportion of negative responses indicating concern or disagreement with planned activities in this area. Still significant proportion of respondents expressed a positive attitude towards the planned mining. Specifically, 12.4%

Figure 2: How do you think lithium mining would affect the areas mentioned?

Source: Own research, 2024

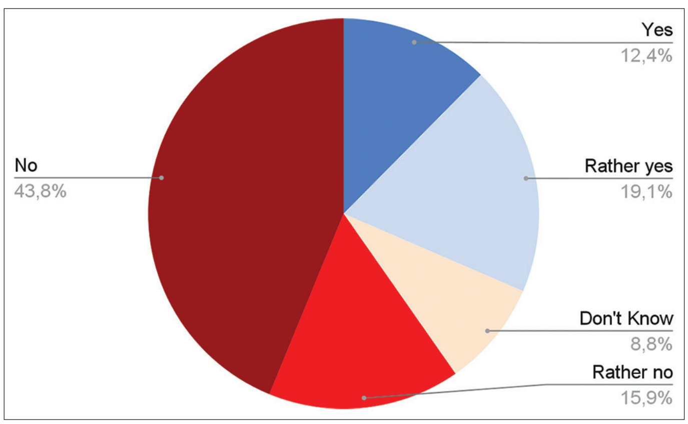
answered "yes" and 19.1% answered "rather yes." This suggests that there is some support for the implementation of lithium mining. The responses of "don't know" (8.8%) and "rather no" (15.9%) also indicate a degree of uncertainty in the attitudes of the population. These results also indicate a lack of a proactive approach by public institutions to ensure that local residents are sufficiently informed. Citizens and municipal representatives are demanding more detailed information on the plans and impacts of mining on the environment and quality of life.

The government and investors are urged to improve communication and transparency with the communities affected by mining and to specify the benefits and possible compensation associated with the project. Cities and municipalities have taken a cautious approach to the project, with some mayors and regional politicians stating that lithium mining should not disrupt the quality of life of residents or harm the environment.

4.4. Economic Returns from Extraction

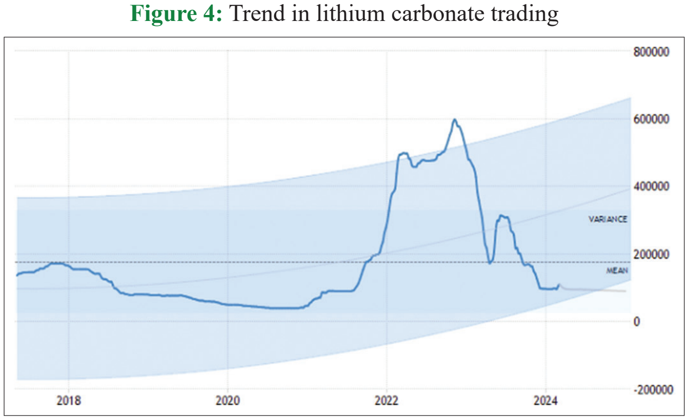
The research on lithium prices and its impact on the lithium-ion battery market demonstrates the key role of technological development and innovation, with lithium price trends also determining the attractiveness of lithium deposits and directly influencing the decision-making process regarding mining. Figure 4 shows the evolution of the lithium price, including a trend line which serves as an indicator of the medium/long term trend from which the current price may temporarily deviate.

Figure 3: Attitude of the population towards starting lithium mining



Source: Own research, 2024

Figure 4: Trend in lithium carbonate trading



Source: Trading Economics, 2024

According to Goldman Sachs Bank (Ecofin, 2024), it is premature to expect an end to the slump in the prices of these raw materials, with the bank highlighting the aforementioned persistent supply of these commodities and a decline in demand from the EV industry, which could extend the period of lower prices. The investment bank also highlighted that the projected lithium surplus in 2024 remains substantial and that prices are expected to fall by 25% over the next 12 months, but it is premature to talk about a long-term price decline (Business Insider, 2024).

According to global macro models (Trading Economics, 2024), the price of lithium is not expected to fall significantly further in the next 12 months, with only a slight drop in price to 89 thousand yuan expected. According to Ciez and Whitacre (2016), lithium price fluctuations do not have a major impact on battery prices, allowing the industry to adapt to these changes with minimal impact. The use of more expensive lithium precursors leads to a <1% increase in the cost of the lithium-ion cells considered. Similarly, larger fluctuations in the global price of lithium (from 0 to 25 USD/kg from a baseline of 7.50 USD/kg Li2CO3) do not change the cost of lithium-ion cells by more than 10%. Swain (2017) highlighted in his study that lithium production has been almost flat for the last 5 years, but battery recycling is <3%. Given the expected demand, it is important to better understand how lithium can be recovered from different sources and recycled. On the other hand, the cost of lithium is a relatively small part of the total cost of producing lithium-ion batteries. New research points to the need to further address the challenges associated with the development and application of lithium-ion batteries; according to Shin et al. (2022), lithium-ion battery manufacturing technologies are continuously evolving, becoming cheaper, greener and more efficient.

5. DISCUSSION

Current research in the field of lithium processing points to the critical need for continued research and innovation and a strategic approach to the production and recycling of these key components of modern technology. The development of new technologies and processes for lithium recycling plays a key role in efforts to minimise the impact on the environment and improve the efficiency of use of this valuable resource (Bui et al., 2018; Moss et al., 2013). The global lithium market is also characterised by price volatility, a consequence of the imbalance between supply and demand. According to Restrepo et al. (2023), the transition to greener technologies in transportation depends heavily on lithium prices and sudden changes in prices can threaten the development of electric vehicle production. Wang and Koenig (2023) stated that lithium supply and production will need to increase to make the transition to greener technologies in transportation more affordable.

To stabilise prices, strategic lithium reserves will need to be built up and international cooperation developed. To reduce volatility in the lithium market, governments and private companies could set up special funds to help stabilise the market and reduce the risks associated with large price changes. These funds should be part of investment portfolios in global stock markets or other energy sectors where prices behave differently from lithium prices. Lithium mining has significant negative environmental impacts, including landscape degradation, pollution of water resources and reduced biodiversity. These impacts require careful assessment and management to minimise negative impacts on ecosystems and local communities. Lithium mining and processing should be conducted in a responsible and sustainable manner, which means developing innovations in mining and processing technologies which minimise environmental and social impacts on communities and the region. At a regional level, collaboration between the mining company, government institutions and local communities based on transparent and inclusive decision-making processes and implementation of sustainable practices is key to maximising positive impacts and minimising negative impacts. Investments in infrastructure and community development will bring additional benefits such as improved access to basic services, as shown by Jerez et al. (2021). However, it is important that these activities take into account the needs of local communities and minimise negative impacts on the environment and society (Liu and Agusdinata, 2020).

Rodrigues and Mendes (2018) see the solution in transparent and sustainable activities which do not exceed environmental and social regulations. For lithium mining to truly benefit communities, it is essential to include all stakeholders in the decision-making process and ensure that regulatory frameworks and policies properly reflect the needs and concerns of local communities. It is important to balance economic opportunities with environmental protection and social justice. Ostrom (2007) adds that it is also essential to create effective institutional frameworks which enable collaboration and accountable behaviour among different stakeholders. Raising awareness of the benefits and effectively addressing concerns about environmental impacts are key to improving the perception of lithium mining in communities which tend to oppose it. According to Ribeiro et al. (2021), an assessment of community attitudes towards mining can lead to the rejection of mining and therefore there is a need to initiate a dialogue with residents as part of transparent communication on the subject. This can be ensured by offering the community the opportunity to participate in the planning and oversight of mining through community-led teams. Communication of a long-term plan for the sustainable development of the area, which should include both the mining period and plans for the post-mining period, also plays an important role. These aspects underline the need for an integrated and multidisciplinary approach. International cooperation and the development of regulatory frameworks which promote sustainable practices and ensure the protection of the environment and the rights of local communities also play an important role. Transparency and the involvement of local communities (Konte and Vincent, 2021) in decision-making processes is important to ensure that lithium mining and processing is carried out in a way which is ethical, sustainable and that respects the needs and expectations of all stakeholders.

6. CONCLUSION

Based on the research conducted, it can be concluded that lithium mining brings both negatives and positives; on one hand there is a risk of increased environmental pollution and negative impacts on local communities and ecosystems. Ecological degradation and polarisation of communities can outweigh the positives if not addressed. On the other hand, lithium mining offers the potential for economic transformation by diversifying the economy, promoting innovation and research and development which leads to the growth of new businesses and job creation. In terms of restructuring an old industrial region, it can bring about the development of new industries and production. The overall efficiency of mining and its benefits will depend on the setting of regulatory mechanisms and technological advances in mining methods. At the same time, it is crucial to ensure adequate compensation and countermeasures to mitigate negative impacts. Although the price of lithium has been declining in 2024, in the long-term reversal and growth can be expected due to the increase in demand for battery production and energy storage.

In response to the question of whether the current regulatory and policy framework sufficiently reflects the needs of municipalities, it should be noted that there are regulatory mechanisms in the European Union and the Czech Republic which are aimed at minimising the negative environmental impacts of mining. However, research shows that there is insufficient involvement of local municipalities and communication with citizens, leading to an aversion of residents to starting lithium mining. In this regard, the specific needs of sites affected by lithium mining are not sufficiently communicated to communities and their elected representatives. Hooghe and Marks (2003) propose a multi-level governance model, Ostrom (2017) a polycentric governance model of measures to mitigate mining impacts and maintain sustainability and community development. Both approaches allow for effective coordination between different levels of governance and adaptation to specific local circumstances. Limitations of the research developed can be found in the applied desk research method, as the quality and timeliness of the information obtained may be affected by the availability of resources. Therefore, qualitative research was also developed, combined with interviews with residents, experts and political leaders, in order to critically approach the information obtained. Future research should focus on further analysis of the decision-making process, how it supports the development of responsible and sustainable extractive practices and the involvement of local communities in decision-making processes.

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