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# MODEL OF LOCAL SUSTAINABLE DEVELOPMENT IN THE AREAS OF CO-OCCURRENCE NATURA 2000 SITES AND NON ENERGY MINING INDUSTRY (NEEI)

Krzysztof Wrana[1], Leszek Trząski[2*], Magdalena Głogowska[1], Monika Lebek[1], Waldemar Chmielewski[1], Waldemar Szendera[1]

[1] *Sustainable Development Centre, Institute of Environmental Protection (Warsaw, Poland)*
[2] *Department of Water Protection, Central Mining Institute (Katowice, Poland)*
[*] *Corresponding author: ltrzaski@gig.eu, tel. +48 32 279 22 96, fax: +48 32 259 21 54*

**ABSTRACT**

| | |
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| **Purpose** | The article is a response to the lack of systemic solutions that should help in preventing/mitigating conflicts between the needs of non-energy mining industry (NEEI) and nature conservation requirements under the NATURA 2000 system. |
| **Methods** | Construction of conceptual models based on the results of surveys carried out in the framework of the research project "Economic activity models" 2013, and on the complementary literature studies. |
| **Results** | The conditions under which both types of activity could together drive the economic development of the municipality and provide its local specialization are highlighted. The barriers to the implementation of such a scenario are described, and an explanation about how to break through these barriers is provided. The necessary directions of the legal and organizational changes are described, relying on the good practices implemented in other European countries. |
| **Practical implications** | The article contains a proposal for a strategic approach that would help Polish decision-makers and local communities in preventing and mitigating the local conflicts between nature protection and the exploitation of mineral resources. The results can be used in the process of elaborating the national policy management of mineral resources.<br>The approach proposed in the article should also be applied to the elaboration of development policies/strategies at a municipality and regional scale, wherever there is a potential conflict between mining and nature conservation needs. |
| **Originality/ value** | The model presented is an original proposal. This is the first attempt, in Poland, to indicate a scenario approach to solving problems concerning the impact mining has on nature. The approach should be applied both at a national and local level. |

**Keywords**
*sustainable development model, NEEI, NATURA 2000, barriers*

## 1. INTRODUCTION

The aim of this article is to propose a systemic approach, which will allow an equilibrium between natural resources exploitation in NATURA 2000 protected areas and economical/social development to be found. The article uses the output of the research project "Economic activity models in municipalities situated in NATURA 2000 areas" (Models, 2013). The model recommended in the article is a strategic approaches which allows for the merging interests of a country's economic branches with the economic and social aspirations of the inhabitants of the NATURA 2000 areas and also with the requirements created to protect environmental heritage. In the proposed model for the mining sector, i.e. section B according to the PKD 2007 classification, there is a perspective action scenario, which is intended to be accomplished on a local level in collaboration with every interested party, so the local development would fulfil the rules of the balanced growth such as economy development stability, high life quality and spatial order. Similar models had also been formulated for other economical branches, i.e. for sections A, C, D, F, H, I and R (Chmielewski, Głogowska, & Wrana, 2014; Borsa, Chmielewski, Głogowska, & Wrana, 2014).

Within the aforementioned research, for PKD section B, 94 municipalities with a significant percentage of NATURA 2000 areas were statistically studied. Creating the typology of the municipalities with NATURA 2000 areas, a municipality type was distinguished according to the economic usage of

the natural resources. One of the criterions was the local budget royalty's expense, i.e. opencast and depth mining combined, focusing mainly on the cases of the non-energy resources mining (NEEI – Non-energy Extractive Industry by European Commission Terminology). Among the analysed municipalities, 49 had this type of income. The construction of the scenarios is based on the analysis of the most extreme cases, i.e. municipalities, where the royalty's expenses were the highest and the lowest. As well as using statistical data as a source of information, data contained in local documents, mainly local development strategies, was also used.

In the cases of co-occurrence NATURA 2000 sites and non-energy extractive industry, the model of local development relates to the following aspects:

- main challenges,
- desired effects of model implementation,
- model implementation partners,
- local subjects relations,
- resources and support for local subjects,
- economic activities developed within the model,
- risk for the implementation of the model.

## 2. PROPOSED MODEL LINKING THE PROTECTION OF NATURE 2000 SYSTEM TO MINING-BASED LOCAL ECONOMIC DEVELOPMENT

The main challenge for the municipalities located in NATURA 2000 areas, and at the same time being under the influence of NEEI mining, is to create and to implement local development policy which would make it possible to take advantage of both the excavation/processing of minerals and from nature protection. The proposition of the model approach based on constant cross-sectorial cooperation is presented in Table 1. For the process of model design the following assumption was followed, that the effectiveness of the policy will depend on combining the necessary elements of a centralised approach with a decentralised decision-making mechanism based on the participation of local stakeholders like self-government, industrial companies, NGOs, R&D institutions.

**Table 1.** Model of economic development based on linking mining activities (PKD – section B) to protection of NATURA 2000 system. Following the results or research project of research project N N305 173640 (Models, 2013)

| | Diametric solutions in the model | | Integration model for diametric solutions |
|---|---|---|---|
| | Centralised solutions | Participatory solutions | |
| Main challenges | The creation of local policy, including a coherent, strategic vision shared by the entire local community, detrimental to long-term use of minerals from the active protection of nature as pillars of sustainable economic development of the municipality.<br>Taking into account legislative changes, technological and psychosocial circumstances likely to affect the potential conflict between the mining/mineral processing and the protection of nature/the landscape. | | |
| Desired effects of model implementation | Reduction of negative influence of mine exploitation on the environmental and cultural components of the landscape.<br>Minimization of conflicts between mining activities and other forms of land use.<br>Post-mining areas revitalization combined with creation or restoration of NATURA 2000 protected habitats.<br>Changing attitudes of the local economy: instead of being limited to the extraction of minerals, maximum utilization of their processing and, consequently, the development of the labour market and increase the income of residents and revenue.<br>Eliminating the negative impact of mineral exploitation on the image of the municipality.<br>Dissemination of practical knowledge about ecological solutions in mining and mining related activities. | | |
| Model implementations partners | Local self-government.<br>Large companies which are external investors or buyers of extracted materials.<br>Companies exploiting minerals.<br>Companies processing of minerals.<br>R & D institutions operating in the mining environment.<br>Companies involved in the identification of deposits.<br>The state administration specialised in environmental protection, especially RDOŚ as pursuing the protection of NATURA 2000 sites. | Local self-government.<br>Local mining companies.<br>Local businesses minerals processing.<br>R & D institutions operating in the mining industry environment.<br>Companies involved in the identification of deposits.<br>Civic organizations, including the ecological profile. | Local self-government.<br>Companies covering mineral extraction, selling and processing.<br>R & D institutions operating in the mining industry environment.<br>Companies involved in the identification of deposits.<br>The state administration specialised in environmental protection, especially RDOŚ (Regional Directorate for Environmental Protection) as pursuing the protection of NATURA 2000 sites.<br>Professionals - scientists and researchers specialized in issues concerning nature protection in mining activity areas. |
| Local subjects relations | Cooperation networks with the participation of major players in the mining sector.<br>Local self-government and business as the partners in monitoring the local impact of mining activities.<br>R & D institutions cooperating in the implementation of new technologies for the exploitation of the deposit.<br>Enterprises of various industries forming chains of supply-side in relation to the processing of extracted materials.<br>External investors revitalizing post-mining areas in public-private partnership with the local self-government. | Cluster structures consisting of local businesses, implementing joint activities and projects for the innovative use of natural resources municipalities, including local processing of extracted minerals.<br>Local stakeholders together revitalizing former mining areas (including creation or restoration of NATURA 2000 habitats). | Clusters of local companies and external interacting in a rational, innovative management of local natural resources.<br>Enterprises of various industries forming chains of supply-side in relation to the processing of extracted materials.<br>Local self-government monitoring in partnership with the business impact of mining activities.<br>R & D institutions cooperating in the implementation of new technologies for exploitation of the deposit and for processing of extracted materials.<br>Local entities belonging to different industries and specialties, together revitalizing post-mining areas (including the active protection of nature and cultural heritage, qualified tourism and creative industries). |
| Resources and support for local subjects | Recognition of mineral resources and estimating the profitability of their operation.<br>Precise local law regulating the operation (acting complementary to national law).<br>Development of technical infrastructure enabling the collision-free transportation of extracted materials, unobtrusive for residents and for the environment.<br>Solutions limiting the negative impact of the operation on the landscape and on its components, including habitats. | Recognition of mineral resources and estimating the profitability of their operation.<br>Precise local law regulating the operation (acting complementary to national law).<br>Development of technical infrastructure enabling collision-free transportation of extracted materials, unobtrusive for residents and for the environment.<br>Financial incentives for local businesses. | Recognition of mineral resources and estimating the profitability of their operation.<br>Precise local law regulating the operation (acting complementary to national law).<br>Development of technical infrastructure enabling collision-free transportation of extracted materials, unobtrusive for residents and for the environment.<br>Solutions limiting the negative influence of mineral extraction on water balance, quality of surface water and ground water, and the landscape.<br>Practical use of the knowledge about natural succession processes on post-mining areas and the ways to control these processes. |
| Economical activities developed within the model | Mining activities.<br>Manufacturing and service activities in support of mining operations.<br>R & D activities.<br>Activities related to the revitalization of post-mining areas. | | |
| Model accomplishment risks | The exploitation and accumulation of negative effects on the environment could be on too large a scale.<br>Disturbance of local development in the case of premature termination or abandonment of mining. | Excessive degradation of the landscape caused by the scattering of extraction activities over a wide area.<br>Disturbance of local development in the case of premature termination or abandonment of mining. | Excessive degradation of the landscape.<br>Disturbance of local development in the case of premature termination or abandonment of mining. |

## 3. THE OVERALL SCENARIO OF LOCAL DEVELOPMENT IN THE CONTEXT OF THE PROPOSED MODEL

The logical consequence of this model is a general scenario for sustainable development of the areas where NATURA 2000 sites and NEEI co-exist (Fig. 1). Elaboration, with constant involvement with representatives from all sectors', of transparent local growth policy is just the first stage of the process oriented on economic specialization based on linking the advantages provided by the NATURA 2000 system to the advantages from mining activities and the local processing of extracted minerals. This specialization will be possible provided that the procedures will work effectively to prevent conflicts between mining and nature conservation (including NATURA 2000), and to resolve already existing conflicts. In collaboration (instead of ongoing conflicts) amplification of local and regional links should occur, product chains and value chains, related to the management of mineral resources, ecological post-mining land development and the creation of specific local brand, will appear.

The presented logic of development includes the assumption that post-mining land revitalization is a prerequisite for strengthening the local economy. Rejection of the common belief that revitalization is only possible and desired after reaching the assumed economic growth must be rejected. The opposite must be accepted: the process of revitalization should be an essential lever of a municipality's development. This means, that the revitalisation of a post-mining area should be planned in the early stages of local development policy and it should be implemented throughout the duration of the mining and mining-related activities.

The idea for building local and sub-regional economy links around both mining activities and active nature protection with the use of innovative methods adapted to a specific place, is strongly linked to several aspects of the EU 2014–2020 cohesion policy. One aspect is linked with the popular recently term "smart specialization" and it refers to the use of regional and sub-regional endogenous potential to create specific, unique products and business niches' around them. It should be done by building cross-sectorial cooperation networks to manage and to use possessed and known resources. It is expected that smart specialisation will have its spatial and local dimension (specialisation in the region, not only region specialisation).

Taking advantages from both mining and natural heritage should be considered in some provinces of Poland as a possible local/sub-regional strategic priority. Another aspect is linked with the need to understand revitalization as an action integrating every element of spatial order and engaging each group of stakeholders. In the case of the mutual management of mineral resources and NATURA 2000 sites, revitalization would mean the creation of integrated solutions of a centralised and participatory approach.

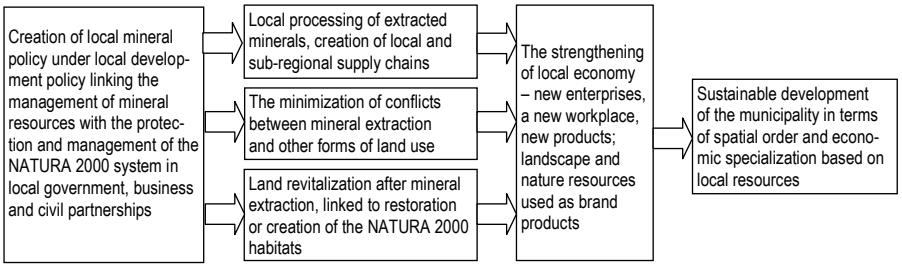


**Figure 1.** A general scenario for the implementation of sustainable development at local scale on linking mining and mining related activities to the protection of the NATURA 2000 system. Following the results of research project N N305 173640 (Models, 2013)

## 4. OVERCOMING BARRIERS AND OBSTACLES FOR SUSTAINABILITY OF LOCAL DEVELOPMENT

### 4.1. Systemic barriers

The main systemic barrier in the creation of local development policy, concerning mineral extraction, is the lack of national and regional policy for mineral resource management. It is the reason why locally there is often strong conflict between supporters of mineral extraction and their opponents in favour of NATURA 2000 sites and these conflicts are often unavoidable and extremely difficult to resolve. The lack of clear national priorities concerning individual mineral deposits, as well as the lack of guidelines concerning mitigation/compensation methods of negative mining activities results in an inability to reach a compromise. In such conditions it is virtually impossible to implement the model presented in Table 1 or the scenario presented in Figure 1.

In the process of creating the national mineral policy it is necessary to appoint potential areas of extraction according to two criteria:

- Geological potential – quality, quantity and technical possibilities for extraction;
- Strategic importance – supply demand, the resources of critical importance.

The use of such an approach would fulfil the EU directive concerning NEEI extraction planning on a national and regional level (European Commission, 2011). The zones designated by potential and strategic criteria should be analysed, in accordance with relevant guidelines, in terms of the limitations resulting from the need for other local land use forms. The Polish annual balance of mineral resources (Bilans, 2013) and electronic data base (Państwowy Instytut Geologiczny, n.d.) refer to the geological potential of the country. However, information about the abundance of individual deposits and their location, including the data publicly available on GIS platform, do not cover strategic aspects and do not indicate overriding public interest.

The extraction zones should be traced with the usage of GIS tools and the criteria for zoning should not be limited to the localization of the deposit boundaries but also take into

consideration limitations resulting from the needs of other land use forms and, in the case of NATURA 2000, distribution of protected habitats within an individual site. The data concerning potential spatial conflicts between NEEI and NATURA 2000 systems ought to be analysed in advance by mining, geological and environment protection institutions so that it would become clear to what extent Nature 2000 areas constrict mining activities. What is more, possible solutions would appear, for any area, to be important both for the mining industry and also nature protection. These types of analysis, important for mineral policies and nature protection policies, are common in "old" European Union countries and amongst Central European countries, for example in Slovakia (Department for Communities and Local Government, UK, 2012, October 31; European Commission, 2011).

National policy for mineral extraction should also contain clear principles for the local planning of nature protection. The approach implemented in Great Britain seems to be especially intriguing for Polish decision makers. According to this approach, the mineral policy includes the exact localization and ranking of importance of nature protection areas according to local, regional, national and international (like NATURA 2000) interest. In Great Britain each mining enterprise is obliged, prior to obtaining the necessary permit, to adjust extraction activities to be aligned with the protection needs of a specific indicated area. In the case of unavoidable impact the enterprise is obliged to predetermine and to design all activities concerning the creation or restoration of priority habitats. Also the targeted designation of post-mining land use for the planned mining activity area should be designed in advance. Generally, a principle is followed which states that planned mining activity should give "net profit" for biological diversity (Department for Communities and Local Government, UK, March 6 2014). In Catalonia (Spain) restoration plans are mandatory for surface mining companies prior to obtaining the necessary permit, regardless of whether there is a negative impact on NATURA 2000 sites, or not; there are numerous examples of good environmentally sustainable practices introduced for small and medium size companies (Vintró, Sanmiquel, & Freijo, 2014).

Local development policy should refer to priority areas for extraction predefined in national/regional mineral policy and take into consideration the predicted conflicts which concern NATURA 2000. If the deposit is reported in the national mineral policy as particularly important, its operation would be considered in terms of overriding public interest. Then the analysis of the expected local conflicts could serve as the planning and implementation of measures for minimizing and/or compensating for the negative impact on NATURA 2000 sites. This logic of conflict resolution should be included in the local development policies and, as a consequence, translated into:

- local spatial development plan (plans),
- local/sub-regional development strategy,
- NATURA 2000 area preservation plan taking into consideration the influence of mining activities,
- mineral extraction projects with minimal impact on natural habitat, and with predefined habitat creation/restoration; compensation activities should be finalized before the impact occurs,
- the project of the targeted method of post-mining land revitalization/reclamation, executed before the extraction starts,
- general social agreement around mineral mining and NATURA 2000 sites protection, developed before the extraction starts in the best manner.

The indicated range of documents and the proposed involvement of the local community do not go beyond the provisions of Polish law and outside the guidelines of the Commission on the operation of non-energy commodities (European Commission, 2011).

National mineral policy should contain specific guidelines as to the terms and conditions of mining activities for protection of biodiversity despite the impact on NATURA 2000 sites. National guidelines would explain the range of liabilities for designers and for mining enterprises, the expected scope and forms of public consultations, the methods of assessment for alternative solutions, the criteria and methodology for considering overriding public interest, and the conditions for the implementation of compensating measures. The guidelines should also explain procedures referring to permissions given before the NATURA 2000 network was established. Local investors support themselves with these types of elaborations in various countries like Sweden (European Commission, 2011), Spain (Luaces, 2008), Great Britain (White & Jo, 2003).

In paradox, one of the systemic barriers for mineral policy integration with NATURA 2000 management in Poland is the solution acquired in the act of nature protection, which states that the only sector responsible for project development, its acceptance and implementation of the protection activities for a NATURA 2000 site, is the office performing surveillance over this site (RDOŚ). It forces, in practice, local enterprises to stay in opposition to the NATURA 2000 protection system. The concentration of all competences concerning NATURA 2000 only in RDOŚ is also against the postulated, in this article, model anticipating the participation of each sector in shaping local development policy.

Under current legal status it is impossible to employ an active protection instrument like an industrial action plan for the benefit of biological diversity. Such industrial plans used to be carried out under local/regional mineral plans in some European countries like Great Britain, Germany or Sweden. According to such an industrial plan, individual mines should take part in the creation and implementation of the preservation plans for NATURA 2000 areas, including the realization of cost-effective activities for the protection/restoration of habitats in the sites impacted by mining activities. However, the collaboration between the mining sector and RDOŚ in the field of NATURA 2000 protection does not help the fact that legal solutions do not anticipate RDOŚ in the approval process of the mine's operation plan.

A good solution, promoting the transfer of national mineral policy on local activities, would be equipping the national state departments of environmental protection, e.g. GDOŚ (General Directorate for Environmental Protection), with administrative advisory authority, which would oblige the mining industry to consult local exploitation plans concerning the expected impact on natural resources, including the NATURA 2000 system. This kind of consultation system

works for example in Germany, Spain and Belgium. An alternative could be the creation of an independent, government advisory institution working to prevent and solve local conflicts at the economy-nature point of contact, including the impact of NEEI on NATURA 2000. One such institution, called Natural England, operates effectively in Great Britain (British Geological Survey n.d.).

A significant barrier for the implementation of the model, regarding the integration of mineral policy with social development and NATURA 2000 system protection, is the real weakness of spatial planning and, especially, the lack of spatial dimension in the municipalities' development strategies. Decisions on spatial planning and land use are often taken without referring to local plans. In turn, the existing local plans are, typically, too fragmented and they contribute neither protection of mineral deposit nor nature protection. The creation of local strategies rarely makes use of publicly available national and regional spatial information systems. The recognition of deposits and areas suitable for extraction (if the latter will be designated in national mineral policy) on a common map of NATURA 2000 areas and other elements of the natural system, including the boundaries of plots, should be normal practice in spatial planning and strategic analysis. Effectively, all the required data is available in public electronic space, but no proper platform has been created in Poland. There are several portals, e.g. in the United Kingdom (British Geological Survey, n.d.) and in Germany (Bundesministerium für Wirtschaft und Energie, n.d.), which should serve as ready reference solutions.

### 4.2. Informative and social barriers

The consequence of having no mechanisms that allow for engagement between the mining sector and NATURA 2000 sites and their protection activities leads to the suspicious, and sometimes hostile, perception of local mining subjects by environmentally profiled civil organizations. Similar distrust is found in relationships between the mining sector and local governments[1]. When the local mining industry is suspected by definition to have interests which are in opposition to those of the local community, it leads to the local mining industry being viewed more as an enemy rather than as a partner, and this means that it is very difficult to manage the developmental policy integrating actions of the local government, business and civil sector (Górecki & Sermet, 2010a; Ptak, 2011).

The main weakness of local policies and strategies is that they focus only on local government actions/tasks. In the strategic documents, economic issues are generally treated objectively e.g. as the supporting sphere from local authority or as a reference for indicating the assessments of strategic action results. Active economic environment participation, including mining and mining-related subject, on the creation/realization of the local developmental policy or on the creation of local strategy is, unfortunately, a minor phenomenon (Dziemianowicz, Szmigiel-Rawska, Nowicka, & Dąbrowska, 2012). The investigation into the reasons behind this state of affairs is not connected with the topic of this article (a lot is written about Civil Society weakness, atrophy and the crisis in strategic planning), however the obvious reason is the lack of a common attitude of the subjects involved with preventing and solving the conflicts of mineral extraction – municipality's community – nature interface.

Another serious barrier is the false stereotype which concerns, above all, nature protection as a conservational, passive protection of the remaining natural habitats and animals living within it, from human activities. Such a narrow perception of nature protection, including habitats and species in NATURA 2000 system, unfortunately is still present in civil environmentally profiled organizations as well as in local government, business, and even in academia. It is not commonly seen, that most of the complex and constant natural systems, including the protected habitats within a NATURA 2000 system, were developed by human and nature coexistence. Unfortunately, it is not widely understood that maintaining the condition of integrity and spatial continuity of the natural system is related to the efficient controlling of succession processes, enclosing not only active protection but also the creation of resources. The consequence of stereotypical thinking is the belief that the negative economic influences, especially industrial ones, on nature are inevitable and at the same time the negative consequences of nature protection for local economy growth is certain (Makowski et al., 2012). Minerals extraction, in particular, is perceived as the activity, always or almost always, which devastates nature resources (Górecki & Sermet, 2010b).

In reality it is more complex – aside from cases of landscape and particular natural element devastation it is easy to point to examples when the mineral exploitation result leads to, intentionally or not, the creation of a rare natural and species habitat in the regional, national or continental scale. In France, according to comprehensive research, the view that that quarries are a chance for biological diversity is widely accepted (European Commission, 2011). The establishment of a birds' habitat on the terrains of a functioning industrial resources mine, to protect the habitats created by the extraction industry, is practiced in Slovakia (European Commission, 2011). What is more, many of the currently existing, precious environmental (including nature) habitats in Great Britain were created intentionally as a consequence of well-designed and realized post-mining terrain reclamation (British Geological Survey, n.d.). The creation of environmental values as a planned or accidental effect of various types of mining activities had been also presented in Polish literature (Rostański, 2003; Trząski, Caruk, Olszewski, & Zdebik, 2006; Myga-Piątek & Nita, 2008). Unfortunately, good practices concerning avoidance/resolving conflicts between mining and nature protection are not widely known in Poland. The fundamental international studies, such as EUROMINES (European Commission, 2014) and ICMM (n.d.) were not even translated into Polish. It is very difficult to imagine the implementation of the local economy specialization model connecting the exploitation of minerals with nature protection, if their actions are perceived as destined to be in conflict with one another.

The intensified development of spatial informative systems, access to good photographic equipment and visualisation software, easy data archiving, common data access and its circuit digitalization are the conditions facilitating the

[1] Here the causes are more complex and one of them is the fact that the real impact of local government on mining activities in the environmental aspect ends with the decision on the stage of obtaining the environmental license.

formulation and monitoring of development policy in "nature" municipalities under the influence of mining industry. However it does not happen; most of the municipalities do not have ecological stocktaking nor do they take part in the systemic monitoring of natural resources. These municipalities do not use spatial informative systems in their development policy. Because of this, diagnosing problems with scenarios on the economy-nature-society interface is not common standard. Technical, law or financial conditions favour the integration of local development policy, spatial planning and nature protection programming, including minerals management with Nature 2000. But it does not happen, this may be the reason that there is a lack of cross-industry cooperation and a lack of strategic thinking in local decision-making.

## 5. CONCLUSIONS

1. NEEI is not doomed to conflict with the management of NATURA 2000. To reconcile the two forms of activities it is necessary to elaborate local development policy integrating economic, environmental and social aspects. Such a policy can only be implemented if all stakeholders constantly participate in the process. This type of policy should not be realized separately from the spatial planning but it should establish its framework. The essence of this development policy should be the local and regional economy specialization linking local mining and mining related to the creation or restoration of nature/landscape resources in a post-mining area.
2. The creation or restoration of natural habitats and landscape resources is possible throughout mining activities. It requires specialised designing at the extraction planning stage. What is more, the myth about the conflict inevitability between mine exploitation and nature protection should be ignored.
3. The creation of long-term local policy for the sustainable development of the areas of co-occurrence NATURA 2000 and NEEI will only be possible if clear national mineral policy is established. Such national policy should clearly state indexes of prioritized deposits and establish clear rules for avoidance, mitigation and resolving of the conflicts between mining and other forms of land use, including nature protection.
4. A difficult barrier to overcome to implement good practices within the planning and the realization of an active natural habitat protection on mine extraction terrains is the lack of an institution which would provide practical guidelines/guidebooks and at the same time would fulfil the advisory/consultative function. This role should be carried out by the administration of environment protection, even if it requires statutory changes.
5. Systemic solutions to support local development policy, as well as good practices for the areas of co-occurrence NATURA 2000 and NEEI are already well known and established in the rest of Europe. For Polish politicians and decision makers it is enough to benefit from the experience gained by the "old" EU countries and also by some neighbouring countries.

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