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Review on industry, business and biodiversity assessment in the Czech Republic

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PREFACE

(Author: P. Petřík)

This national review was elaborated within the international project BioStrat (<http://www.biostrat.org>). It is not expected that it will cover all aspects of the topic, but the compilation of the reviews from different countries will produce an overview, which will help to develop the recommendations at the European Platform for Biodiversity Research Strategy (EPBRS) meetings (www.epbrs.org). The on-coming Paris EPBRS meeting will deal with Economic dimensions of biodiversity. We focused on three priority topics:

- 1./ Does it exist national regulations concerning
 - 1.1. biodiversity impact assessments? If yes, for which type of activities?
 - 1.2. mitigation/compensation for biodiversity impact? Are these regulations implemented?
 - 1.3. Does it exist any agency, public or private, to manage impact evaluations and/or compensations-mitigations (such as mitigation banking...)?
- 2./ Do the companies
 - 2.1. have any accounting of their impacts on biodiversity?
 - 2.2. Which main measures have they taken to minimize their impacts?
 - 2.3. Do they contribute to the conservation of biodiversity? Through which types of actions?
- 3./ Research
 - 3.1. Assess the existing or past research activities in partnership with the private sector and the public companies in the field of biodiversity either for conservation in general or focused on the impacts of the companies' activities and mitigation or restoration
- 4./ Ecological engineering
 - 4.1. State of the art of Ecological engineering applied to industrial impact assessment and restoration / mitigation

Regarding this review, the most important information on environment policy was excerpted from the National Biodiversity Strategy of the Czech Republic (2005) and National Capacity Self-Assessment in the CR for Fulfilment of the Obligations of the Rio Conventions (Drhová et al. 2006). All these documents can be downloaded at the Czech Republic Clearing House Mechanism website (<http://chm.nature.cz>).

Our aim was to address people across various sectors. It was extremely difficult to find adepts for this review. Each of six co-authors (scientists publishing in ISI journals, employees of state administrations and officials) has been asked for providing a short review on topic, which is she/he interested in. Two of them are members of the Czech BioPlatform project (<http://www.ibot.cas.cz/biop>) directly related to the EPBRS. After short introduction, the results summarize main findings for the environmental (biodiversity) impact assessment and its implementation to the companies' strategies, legal framework and scientific tools are particularly represented. The conclusion is aimed at gaps in research in this area.

INTRODUCTION

(edited by dr. P. Petřík based on contributions of Mgr. M. Smutný, Ing. L. Nondek, dr. D. Vačkář, Ing. J. Zbořil & Assoc. Prof. J. Boháč)

Technology (artificial system created by man) and natural ecosystems are in inherent conflict, which relates to:

1. competition for space (production facilities, transport, extraction of raw materials, waste disposal, and energy production facilities – especially hydro energy facilities¹, forestry and agriculture, water reservoirs, sport facilities etc.),
2. emission of pollutants (incl. long range transport of pollutants in the environment, bioaccumulation, food chains, toxicity etc.),
3. physical interferences (barriers to migration, mechanical injuries, disturbance by noise and light, landscape fragmentation etc.).

The impact of technologies to biodiversity varies with character and magnitude of the technological processes. From this point of view there are no "green technologies" with zero (or even positive) impact to biodiversity. End-of-pipe or recycling technologies can be thus understood as only corrective "plug-ins" consuming additional energy and eventually generating additional wastes (even if contributing to lowering the adverse impacts). The conflict can be mitigated, however the measures/limitations adopted depend upon a wide social consensus. Thus, the state of biodiversity is very affected by business policy strategy and strategic documents.

As recognized by the Millennium Ecosystem Assessment, the change of ecosystems and biodiversity will affect the profitability and competitiveness of industries (Millennium Ecosystem Assessment 2005). The loss of biodiversity and related ecosystem services could impair the access of industries to biodiversity and ecosystem inputs. Moreover, the cost of industry operations could increase as a result of the actions abating the ecosystem degradation and

¹ The issue of biodiversity was addressed e.g. in SEA of Operational Programme Enterprise and Innovations (2006), where one of the programme's areas of intervention provides support of higher use of renewable energy sources including water energy. The assessment identified potential risks, which could lead to increased barriers of migration routes and corridors.

complying with environmental standards. However, the ecosystem change provides industries with many opportunities as novel markets for biodiversity and ecosystem services emerge (Corporate Ecosystem Services Review 2008).

Since the 1950s, soil organisms (Rusek in Hruška_Cienciala, 2003) and aboveground plant communities' biodiversity in terrestrial ecosystems was reduced significantly in the CR as results of increasing industry impact and infrastructure and environment non-friendly forest and agricultural management. The industry in the Czech Republic has been structurally transforming since the 1990 becoming "lighter", focused on the greater energy efficiency, contributing less to the environmental degradation and more export oriented (Czech Statistical Office 2007). While during the 90's industrial production had been contributing to the wide-ranging ecosystem damage of especially the mountain forest ecosystems (evident in the high defoliation rate and forest biodiversity loss), extensive investments at "the end of the pipe" and structural change of the economy have lead to the gradual reduction of pressures on ecosystems. The current Czech industry is dominated by sectors not directly dependent on biodiversity (manufacture of electrical and optical equipment, manufacture of transport equipment, manufacture of basic metals and fabricated metals). There are still several sectors closely tied to biodiversity, e.g. food, forest based industries, leather, textile manufacturing, water supply or mining and quarrying. However, there is no quantitative estimate of industry dependence on biodiversity available for the Czech Republic.

From the business point of view, the concept of biodiversity seems to be quite inexplicitly (vaguely) defined and the tackling this issue in business may be thus quite difficult. Sometimes, to disentangle human-made changes from natural dynamics could complicate legal regulations on biodiversity protection and ongoing implementation of biodiversity into decision-making process and business in in practical management.

RESULTS

(edited by P. Petřík based on contribution of all authors)

Companies in the CR and their contribution to the biodiversity conservation

(Dr. D. Vačkář)

The majority of industry enterprises take into account environmental aspects of their operation, based on either law compliance or corporate image. However, biodiversity has been only recently recognized as an important issue in accounting for environmental sustainability of industries. For example, the OKD, the largest mining company operating in the Czech Republic, is currently recultivating more than 600 ha of land. However, the biodiversity concerns should be more integrated into the recultivation plans. KOOH-I-NOOR Hardtmuth Company, one of the world leaders in the production and distribution of first-rate stationery, exclusively uses wood, which is grown silviculturally, that is from tree plantations. Company profile is thus based on the awareness of the tropical deforestation as a global ecological problem. However, the biodiversity is again not explicitly mentioned in the ecology and safety section of the company profile. The same is true for Czech leading industrial companies, among others ČEZ group, Škoda Auto or

Plzeňský Prazdroj, which focus their policies rather on environmental components immediately influenced by the production, serving as a raw material of production (e.g. water) or saving the company operation costs (e.g. reducing carbon footprint or recycling materials). The biodiversity will be considered by companies which production is linked directly to the quality of environment. Veolia Water, the largest water management company in the Czech Republic, has integrated biodiversity as a key factor when it comes to its operational activities.

Legal framework of biodiversity assessment and accounting of the impacts of companies on biodiversity in the CR

(Mgr. M. Smutný, Ing. L. Nondek, Ing. M. Hájek & Ing. J. Zbořil)

The Act on Environmental Impact Assessment covers both projects (i.e. EIA) and concepts (i.e. SEA). The § 2 defines that environmental impacts include impacts to fauna and flora, ecosystems, soil, geology, water, air, climate and landscape, natural resources, tangible property and cultural heritage. The Act lists all types and categories of concepts and projects, which have to undergo SEA or EIA. The project categories related to the biodiversity include water dams and reservoirs, coal and other mineral resources mining, transport and energy infrastructure, industrial production (cement, plastics, organic and inorganic chemicals, oil refineries, transport and energy infrastructure etc.). The Act also stipulates necessity of adopting relevant mitigation and/or compensation measures if the adverse impacts are identified. The identification of the relevance of the project / concept to biodiversity shall be done in the scoping stage (legal term “fact-finding procedures”), since the objective of the scoping is to define the scope of the assessment i.e. key issues which shall be addressed in detail within further assessment. The scoping statement is issued by the EIA/SEA component authorities (Ministry of the Environment – for large scale projects, and Nature Protection Departments in Regional Authorities) – the developer and experts preparing EIA/SEA report have to follow the requirements given by the scoping statement.

Neither biodiversity nor other environmental components are valued from the economical / financial point of view within EIA/SEA processes in the Czech Republic. Dendrology studies as the only exception are usually prepared as a part of EIA if the project implementation will lead to cutting trees and bushes. The price of the trees is estimated by the study based on certain criteria (species, tree height etc.).

The biodiversity protection is generally stipulated by the Act on Nature and Landscape protection no. 114/1992 Coll., as amended. This act provides – among others – legal framework for Natura 2000 sites (i.e. Special Protection Areas and Special Areas of Conservation). In its § 45h it defines that all concepts (plans, programmes, policies and other strategic documents) or projects which are likely to affect the territory of Natura 2000 site(s) have to be a subject of the appropriate assessment – the process of this assessment shall be governed by the Act on Environmental Impact Assessment no. 100/2001 Coll., as amended. In case the likely adverse effects of the concept or project to the Natura 2000 site cannot be excluded, the plan or project owner / developer has to prepare alternatives aimed at avoiding of adverse effects or (if not possible to avoid) to mitigate these effects.

The impact and its limitations are partially covered by various operational regulations (including standard and extraordinary conditions) – Integrated Prevention and Pollution Control (IPPC). Czech parliament has in 2008 adopted the Act on Claim Prevention and Its Compensation no. 167/2008 Coll. The act is transposition of the Directive of European Parliament and Council

2004/35/EEC about Environmental Liability. In 2002, Ministry of the Environment has adopted Methodology for Environmental Management Accounting. Environmental Management Accounting identifies, gather, assess, analyse and transfer information on environmental fluxes and costs that are important for decision-making process in a company. Companies operate with environmental credits and debits in the methodology. Environmental debits are formed by costs invested to environment protection, i.e. costs related to the compensation of negative activity of a company. This Act gives large opportunity for public discussion to set up limits of environmental liability but without responsibility for potential economic loss. Hence, representatives of economic sector criticize this legal regulation.

Another group consists in market conformable instruments – e.g. trading in permits for emissions of greenhouse gases (Act No. 695/2004 Coll., on conditions for trading in permits for emissions of greenhouse gases and amending some Acts), ecolabelling and voluntary activities of business entities.

Biodiversity and environmental assessment

(Mgr. M. Smutný, Ing. L. Nondek, dr. D. Vačkář)

In our opinion, biodiversity impact assessment should be carried out from strictly biocentric point of view and structured into following steps:

1. Collection of all relevant technological data and information incl. related uncertainties (see role of uncertainties in decision processes),
2. Demarcation of affected space (geographic area) in analogical way with LCA (incl. mining, cultivation, waste disposal, transport etc.),
3. Assessment of impact of the above factors upon biodiversity and ecosystems inside given boundaries,
4. Estimation of risks and uncertainties.

The biodiversity and its importance is generally underestimated – the most discussed and “hot” issues within EIA/SEA processes are usually those related to public health i.e. air and water pollution, noise etc. However, examples can be found where biodiversity protection was one of the key issues – e.g. highway D8 through České středohoří protected area, ski resort on Smrčina (Šumava National Park) etc.

One of the current issues related to biodiversity present water management plans, which are being prepared for all main river basins in this country. They identify areas for future water dams and reservoirs, some of them directly affecting Natura 2000 sites. The preparation of the plans including conducting SEA shall be finished in 2009, but obviously the further process will facilitate discussions on importance and valuation of the biodiversity and specification of appropriate compensation measures.

Biofuels for transportation, wind energy and carbon dioxide capture and storage (CCS) are other examples of technologies requiring an objective biodiversity assessment complementary to their CBA and/or sustainability assessment.

One of the ways to make biodiversity interesting for industries is to introduce “biodiversity credits”. These would be tradable permits designed for the market exchange. These credits would be devised from the impact assessment of industries’ impacts on biodiversity. There are parallels between the carbon trading and biodiversity, which could be further reinforced by building the

biodiversity bank (Bekessy & Wintle 2008). Biodiversity credits could be allocated according to the industry contribution to biodiversity degradation or enhancement, respectively. Ecosystem conservation or restoration projects with documented benefits for biodiversity could earn extra biodiversity credits, which could be exchanged, to companies with more negative impacts on biodiversity. Biodiversity credits would create the market-driven motivation for biodiversity conservation promoted by industries.

Research on implementation of Resource equivalency method in the CR

(Assoc. Prof. J. Boháč)

The European Environmental Liability Directive prefers recover of natural resources instead of their monetary assessment. The 6th FP EU project in REMEDE (Resource Equivalency Methods for Assessing Environmental Damage in EU) deals with the implementation of resource equivalency method in the EU. Czech group of scientists focused on the revision of method in a study area heavily damaged by coal mining in the past (Boháč 2008). The equivalency analysis includes methods and approaches (e.g. remediation) to determine type and range of sources and losses of ecosystem services as a consequence of environmental damage. They are dealing with Habitat Equivalency Analysis (HEA), where the loss is expressed in term of a habitat and compensated as its remediation and Resource Equivalency Analysis (REA) where the loss is expressed in the units of natural resources (e.g. number of key species).

CONCLUSIONS

(edited by P. Petřík based on contributions of all authors)

Biodiversity in the Czech Republic has been reduced significantly as a result of non-environmentally friendly industry and forest and agricultural management during the last several decades. After the political changes in 1989, the industry in the Czech Republic was structurally transformed, contributing less to the environmental degradation.

The Act on Environmental Impact Assessment defines that both projects (i.e. EIA) and concepts (i.e. SEA, i.e. plans, programmes, policies and other strategic documents) which are likely to have impacts to fauna and flora, ecosystems, natural resources, landscape, and cultural heritage have to be a subject of the appropriate assessment. However, neither biodiversity nor other environmental component risks are evaluated from the economical/financial point of view within the EIA/SEA processes in the Czech Republic.

Theoretically, the purpose of the assessment (EIA and SEA) is to provide objective and transparent information on the anticipated environmental effects of the project/plan for decision-makers. Teamwork of biologists and technologists, and even economists and social scientists, is a prerequisite. Public debate is usually understood as an essential component of the impact assessment process. The decision-makers have to consider results, but they are not obliged to follow them, i.e. the project/plan with adverse environmental effects can be approved, but with a mandatory explanation of why the results of the assessment have not been included in the decision.

There are some key weaknesses of impact assessment practice in the Czech Republic (see Smutny et al. 2005):

1. Low emphasis on primary goal of the assessment i.e. to ensure the project/concept is implemented in accordance with requirements for environmental protection. This could be due to the existence of ‘two cultures’ (technological and biological) with various methodologies and values, however, some interdisciplinary methods are arising such as, for instance, the equivalency analysis including approaches (e.g. remediation) to determine type and range of natural resources and losses of ecosystem services as a consequence of environmental damage (see Boháč 2008 and project REMEDE);
2. Low impact of the assessment on the final project/concept implementation with insufficient monitoring and lack of capacities for these activities. This could be due to the complexity of ecosystems, difficult measurability (choice of indicators) and complex impact of technology (cumulative and synergy effects); response of ecosystems is delayed and non-linear. Further, cost-benefit analysis or the valuation of ecosystem services is complicated and not easily applicable to biodiversity (economic approach has limits, but we especially lack the monetary estimates of non-marketed ecosystem components);
3. Alternatives are often insufficiently considered and there is an absence on the consensus of how to apply a precautionary principle.

The Ministry of the Environment has adopted Methodology for Environmental Management Accounting. Companies operate with environmental credits and debits in Methodology of Accounting and measure and monitor identified pollutant emissions following the operation permits of Integrated Prevention and Pollution Control (IPPC). Some companies operate installations utilizing the best available technologies, having contingency plans and training for extraordinary/emergency situations that may occur. However, despite the increasing accountability of businesses towards sustainable development, companies are not motivated to include biological diversity into their accounts and concerns. One of the ways to make biodiversity interesting for industries is to introduce ‘biodiversity credits’. These credits would be tradable permits designed for the market exchange and devised from the impact assessment of industries’ impacts on biodiversity (see also Bekessy & Wintle 2008).

To sum up, the results from various biodiversity studies are only rarely linked to conservation practices and insufficiently acknowledged by policy and decision-makers in the Czech Republic. To change this paradigm of strictly benefit-orientated industry towards sustainable management, the most important scientific and practical steps have been recognized (see also Drhová et al. 2006, Petřík et al. 2007, 2008):

1. Knowledge of the initial condition of remediated habitat is crucial if consensus about desirable future status is to be achieved in impact assessments. There are many systems and approaches, which are not integrated in the framework of land-use planning and management plans of companies. Some cost-benefit analysis or the valuation of ecosystem services is easily applicable to biodiversity units as needed. Use of resource equivalency methods in enabling assessment of environmental impacts and remediation options could be solution.
2. Despite various systems of monitoring and indicating biodiversity changes (see Vačkář 2005), the outcomes of long-term monitoring are not fully integrated in the framework of business and companies’ management (particularly the delay of ecosystem on changes).

Hence, both the integration of appropriate biodiversity indicators into business and harmonisation of monitoring systems are needed.

3. There is no training system in education for the economic dimensions of biodiversity (employees of the State Administration, representatives of local governments, managers and decision-makers in agricultural, and SEA/EIA assessors) in the CR. Thus, revision of the methodical instruction for EIA assessors would be recommended, taking into account the requirements of biodiversity-related issues and their training.

There are several research projects dealing with biodiversity in the Czech Republic (<http://aplikace.isvav.cvut.cz>). The central role of concerted action has the Biodiversity Research Center (a network of research institutions involved in biodiversity studies and international projects or centres of excellence with aim to educate young researchers in the field involved in). In the Czech Republic, however, the results from various biodiversity studies are only rarely linked to business practice and insufficiently acknowledged by policy- and decision-makers. There are no absolute solutions and, also in case of biodiversity, a balance must be sought amongst various factors and interests to meet the sustainability criteria.

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REFERENCES

- Bekessy S.A. & Wintle B.A. (2008): Using carbon investment to grow the biodiversity bank. – *Conservation Biology* 22: 510–513.
- Boháč J. (2008): Resource Equivalency Methods for Assessing Environmental Damage in the EU. Case Study – “Chronic Mining Pollution, Czech Republic”. – Manuscript, 22 pp.
- Corporate Ecosystems Services Review (2008): Guidelines for identifying business risks and opportunities arising from ecosystem change. – World Business council for Sustainable Development, Meridian Institute, and World Resources Institute, Washington, DC.
- Czech Statistical Office (2007): Czech industry changes its face. (in Czech) <http://www.czso.cz/csu/csu.nsf/informace/ckta092107.doc>.
- Drhová Z. (ed.), V. Gotvaldová, K. Sutlovičová, M. Šafařík, M. Tesařová & Zima J. (2006): Identification of Priorities for Development and Increasing Capacities for Implementation of the “Rio Conventions” in the CR. Cross-cutting report for the NCSA project. – Ministry of the Environment, Prague.
- Hruška J. & Cienciala E. (2003). Long-term acidification and nutrient degradation of forest soils – limiting factor of forestry today. – Ministry of the Environment, Prague.
- Josh Lipton J., Calewaert J.-B., Ozdemiroglu E., Johns H., Cox J., Cole S., Kristrom B. & Reira P. (2008): Resource Equivalency Methods for Assessing Environmental Damage in the EU. – Toolkit, Manuscript, 120 pp.
- Millennium Ecosystem Assessment (2005): Ecosystems and human well-being: opportunities and challenges for business and industry. – World Resources Institute, Washington, DC.
- National Biodiversity Strategy of the Czech Republic. – URL: <http://www.chm.nature.cz>.
- OECD (2007): Round Table on Sustainable Development: Biofuels: Is the Cure Worse than the Disease? – OECD Paris, 2007.
- Petřík P. (ed.), Čámská K., Dotlačil L., Hruška J., Fanta J., Peterová P., Poštulka Z., Roudná M. & Vokasová L. (2007): Review of knowledge base and biodiversity research results from the Czech Republic that directly contribute to the sustainable use of biodiversity in Europe. – BioStrat review. URL: www.ibot.cas.cz/biop.
- Petřík P. (ed.), Květ J., Pithart D., Pokorný J., Matěna J., Elster J., Maršálek B., Ráb P., Poštulka Z. & Ansoerge L. (2008): Research priorities in the freshwater ecosystems in the Czech Republic. – BioStrat review. URL: www.ibot.cas.cz/biop.

- Sarewitz D., Pielke R.A. & Byerly Jr. B. (eds.)(2000): Prediction: Science, Decision Making and the Future of Nature. – Island Press, Washington D.C.
- Scott W. & Levett-Therivel (2006): Sustainability Consultants, Treweek Environmental Consultants and Land Use Consultants: Appropriate Assessment of Plans.
- Slootweg R. (2005): Biodiversity assessment framework: making biodiversity part of the corporate social responsibility. – Impact Assessment and Project Appraisal 23: 37–46.
- Smutny M., Dusik J. & Kosikova S. (2005): SEA of Development Concepts in the Czech Republic. – In: Sadler B. (ed.), Strategic Environmental Assessment at the Policy Level: Recent Progress, Current Status and Future Prospects.
- Strategic Environmental Assessment for Operational Programme Enterprise and Innovation 2007 – 2013 of the Czech Republic, SEA Report, 2006
- Tuff I. H. & Kostkan V. (eds.) (2008): Research in nature conservation. – Book of abstracts, conference 9-12th September 2008 in Olomouc. Tribun EU, Brno, 108 pp. (in Czech)
- Vačkář D (ed.) (2005): Indicators of biodiversity changes. – Academia, Prague. (in Czech)