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TEMELÍN POWER PLANT AS AN UNUSUAL LANDSCAPE FEATURE

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Abstract

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The nuclear power plant of Temelín can be seen as an unusual landscape feature in rural landscape of South Bohemia. The paper discusses a process of adaptation of local community to the nuclear power plant; more specifically it concentrates on attitudes of local people to it, and comments changes the attitudes have undergone during last ten years. Based on data gained within two sociological surveys (1993, 2004) we can generally state that at present, local community seems to manifest some degree of adaptation to the given situation. The feeling of fear that dominated in 1993 seems to be transformed into the feeling of subconscious disquiet. Existence of the Temelín power plant is, among other things, perceived in terms of a profound change of landscape character. As a result, the feeling of disquiet is most likely triggered by "visual aggressiveness" of plant's cooling towers reaching the height of 155 meters.

Key words: Temelín nuclear power plant, landscape character, quality of life, local community, visual contamination

Introduction

The nuclear power plant of Temelín is the biggest industry construction ever built in the picturesque landscape of South Bohemia. The power plant, during the time when it was built as well as nowadays when it is being operated, has become one of distinct determinants that influences functioning of the whole region. Even today, it is very complex phenomenon and its present role in regional development is extremely difficult to be understood unambiguously.

The power plant meets all attributes of what Forman and Godron (1984) name unusual landscape feature. Though present only at one place in landscape it can be considered a "centre of activity", or "ot spot" of some kind in the area. In other words, this landscape feature is supposed to determine a dynamics of evolution of the whole landscape system.

Originally, the area where the construction took place was a traditional rural landscape located on the borders of three counties, out of main traffic systems. It was characterised by all the features of marginal areas, including character of local population – rural and conservative. Emerging of such a feature there in a relatively short time can be thus interpreted as a stress induced into landscape system, and both its principal subsystems – natural and social ones. Due to its size and also to the fact that both its construction and operation has been based on „know how", which was not at disposal in the locality, the power plant become an alien phenomenon for the local people (Figs 1a, b). As such the power plant turned to be the generator of local social dynamics. Its impact can be seen in terms of two different aspects. Local population has been forced to live under a continuous stress of life hazard; while on the other hand, the power plant can stimulate, directly or indirectly, further socio-economic development of the area

In this case attention is paid to the social subsystem in the area, especially to some aspect of its adaptation to a load which has been induced by a stress factor involved (Cudlín et al., 2001). Within the above mentioned context, this paper, more specifically, deals with the problem of attitudes of local population to the nuclear power plant, and changes the attitudes have undergone during last ten years.

The term of attitude goes beyond the way landscape ecology normally uses to describe landscape – in terms of objectively measured spatial combination of matrix, patches and corridors (Forman, Godron, 1984). It introduces subjectivity into the stage. Attitude to a space has much to do with a problem of feelings and perception of specific spatial elements, and goes far beyond classical physics. According to Löw and Míchal (2003) perception of landscape in terms of man's environment, being culturally contextualised, is primarily done by use of individual psychic processes. Our attitude to the particular space is then done by a degree to which individual attributes of the space match our expectations. They are visual attributes such as assessment of accessibility or our demand for visual balance and harmony among particular objects that play a primary role in the process.

Apparent distinction between objectively existing and measured landscape and its image born in human mind is one of fundamental headstones the concept of landscape character is built on. According to this concept man exists in a physical space, but the world he experiences – i.e. his world, is for him a relation to a locality and a series of nearby lying or distant horizons, not only physical but also divine (Löw, Míchal, 2003). Landscape and its image dissolve, and the latter mostly projects itself back into a landscape as it is described by physical geography. As man is a cultural being, image itself is for him sometimes more important than an origin, when he makes its decisions. As a result, it is not only the state of the landscape itself but the image of the state that may play a crucial role in the process by use of which man adapts to its environment.

Model area and methods used

South Bohemia region in its political delineation became our basic spatial unit (Fig. 2). Among other questions, we tested two space-related factors that were supposed to influence the attitude of people to the nuclear power plant. The first of them was a distance between the place, where they permanently live and

Fig. 1a. Rural landscape of South Bohemia.

Fig. 1b. Rural landscape of South Bohemia with the Temelín power plant.

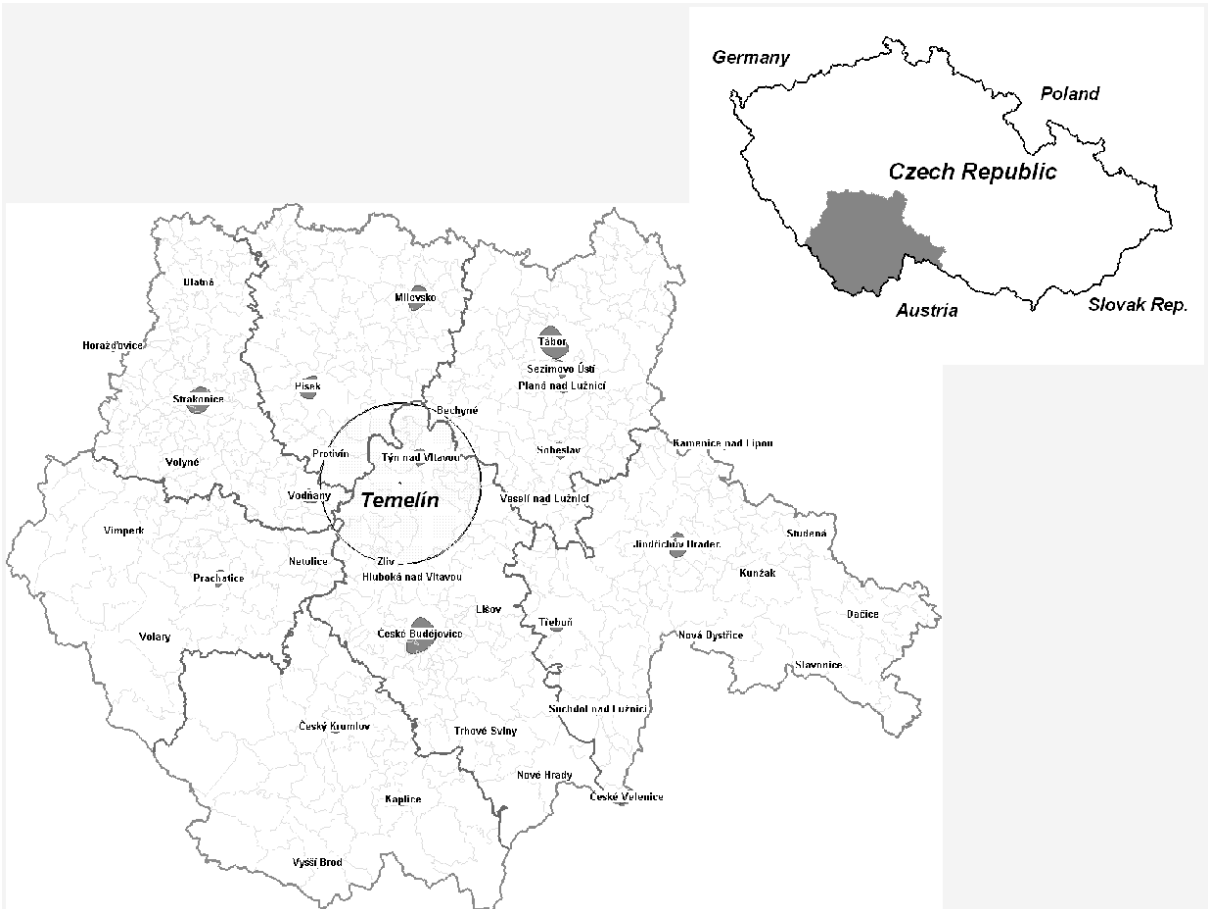

Fig. 2. Model area – South Bohemia region.

the nuclear power plant. To achieve this goal, the region was divided into ten kilometers wide concentric zones that have the plant into its centre. Besides this, special attention was paid to the zone that has diameter of thirteen kilometers – "zone of emergency planning" (Fig. 2), which is a zone under a special regime of management. Concentric division was done a priori and helped us in deriving a sample from the basic set. The other factor of interest factor was the visibility of nuclear power plant from the place people permanently live. Division of model area according to this criterion was done a posteriori, and was based on results of questionnaire survey.

Our paper builds mainly on results gained within the project launched in 2002 that is titled "Socio-ecological and psychological influence of the Temelín power plant on local population", mainly on results of questionnaire survey. The project is an activity fulfilling the article 12 of the Annex of the international Melk Treaty signed by the Czech Republic and Austria. It is primarily focused on changes in quality of life of those people who live in a vicinity of the power plant. The combination of biographic techniques, semi-standardised interviews with experts, as well as massive questionnaire survey has been used to map the opinions of local people. As to the questionnaire research, adult population of the South Bohemia region was chosen to be the basic set. The sample was derived from it by use of combination of quota and random sampling. Size of municipalities (in terms of number of their permanent inhabitants) was used to define quotas. Particular municipalities were then chosen randomly. Finally, 1 033 respondent were questioned. Temelín nuclear power plant became subject of research of the Institute of Landscape Ecology as early as in 1993. At that time, project titled "Changes in South Bohemia 1992-1993" was conducted. The project was aimed at mapping of changes in quality of life of South Bohemian population during the breath taking time at the beginning of socio-economic transformation (tax reformation, separating Czech and Slovak states, etc.) Relation of local people to the Temelín power plant was, at that time, only one of addressed issues. The empirical survey was done by use of questionnaires; 500 respondents were repeatedly addressed.

We took an advantage of the fact that we have "historical view" at hand and compared selected results with those of the ongoing project.

Results and discussion

When we are to comment generally the present situation we can state that South Bohemia population, as a whole, has attributes of a settled one. Existence of the nuclear power plant neither represent the reason making people to leave the region (almost 97% of respondents), nor is perceived as a agent influencing their normal way of living (cca 82%).

However, there are changes apparent between the situation of 1993 and the present one as to the attitude of people to the newly emerged phenomenon. The process of change can be lucidly documented by use of Fig. 3 by comparing of distributions of answers to the question "what are their feelings, while they see the cooling towers of nuclear power plant" which was posed in both in 1993 and 2004 surveys.

In 1993 the towers started to appear above the horizon and the so far abstractly discussed problem grows to get its real contours. At that time, the distribution of answers was a bit "skewed". Feelings as a fear of immediate danger or discomposure dominate, presumably mainly due to the Černobyl accident and the fact that people did not trust in safe operation of nuclear power plants generally. As to the frequency, the third place was occupied by the attitude defining Temelín in terms of evil necessary (Kopáček et al., 1993). Despite slight differences among attitudes of individual subgroups of the whole population (e.g. formed by criteria of gender, age, education, etc.) it could be generally said that in 1993, Temelín power plant was associated with more or less "negative connotations".

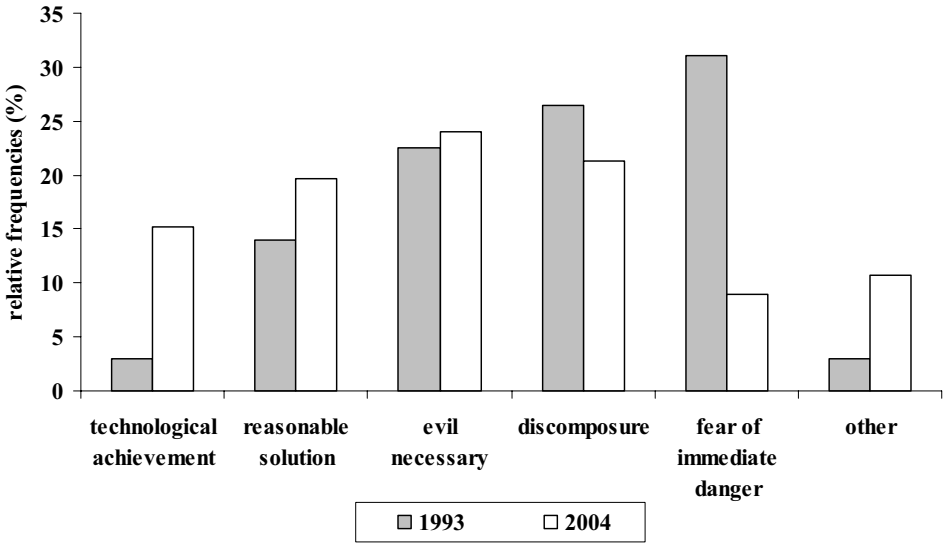

Fig. 3. Perception of Temelín power plant (1993, 2004).

When we compare results gained in 2004 with those obtained in the previous research we can identify two differences. First of all, frequencies are more "normally"distributed along the scale – compared to 1993, feeling of immediate danger has been suppressed and assessment of nuclear power plant as a technological achievement increased profoundly. The other difference is not apparent from the figure, however. It is a decrease of "homogeneity" of the sample as a whole as to the attitude to the plant. Differences among attitudes of particular subgroups (formed by division of a sample by the criteria of gender, age, education etc.) proved to be statistically significant and in some cases highly significant (Table 1 is used as an example). The nuclear power plant can thus be regarded as a very complex (and inherently conflicting) phenomenon.

As the main point can be taken the fact, however, that for the local population the power plant means a life under continuous risk, that they did not voluntarily decide for. They perceive it as something that was forced them from "above". Their activities aimed to stop the construction proved to be vain. To get at least economic compensation for risk seems to be their strategy at this moment. They can do nothing with it but accept the situation, eventually to learn from the whole process. For example, they have learned the game of fighting for their civil rights – they have already formed a civil association, they make lobbying and search for help at regional politicians, etc. in their campaign against the planned construction of deposit of nuclear waste in their region (Těšitel et al., 2004).

T a b l e 1. Perception of the Temelín power plant in relation to the age of respondents (2004).

Age groups	Cooling towers of the Temelín power plant evoke the feeling of				
	Technological achievement	Reasonable solution	Evil necessary	Disquiet	Fear of immediate danger
to 20	5.3	0.0	-4.0	-0.6	0.1
21430	1.5	0.0	-0.6	3.7	-2.5
31440	0.7	0.8	0.6	-2.0	3.9
41450	-2.0	-2.3	4.0	1.7	-2.6
51460	-1.4	2.0	0.5	0.9	-0.6
above 60	-0.5	2.4	-0.6	-2.7	2.1

Adjusted residuals

Statistics	Value	df	Asymp. Sig (2-sided)
Pearson θ^2	112.900[a]	25	0.00

Apart from the discussion whether the power plant brings wealth into the region or not, there is another question worth to be mentioned. Question considering such spheres of quality of life for evaluating of which you cannot use the rational calculus – sphere of feelings of mental well-being of region's inhabitants. Arguments as feeling of fear or danger, or on the other hand, feeling of cosiness and safety, arguments economically not justifiable but still legitimate to be taken into account, dominate there. When we trace the recent history of relation of local people to the nuclear power plant from this viewpoint, we can state that the feeling of immediate danger disappeared. Actually it seems to be transformed into subconscious disquiet which is, very likely, permanently triggered by the fact that almost half of South Bohemia population can everyday see the cooling towers, or at least of steam visibly climbing into the sky (Fig. 4). Some authentic statements of respondents can be used as illustrative examples: "You see the power plant from everywhere, you cannot hide away from it; as soon you see it you know there is a nuclear power plant" or "The steam is coming out of the cooling towers; the clouds are beautiful to watch high in the sky, but once they start to appear from the landscape, it is a little bit frightening. It looked as a mushroom cloud from nuclear explosion many times."

Despite had not been asked directly to the changes in landscape character, the respondents spontaneously mentioned the term when replying to the question that concerned changes in their environment: "Temelín negatively influences landscape character", "the power plant destroyed the most beautiful peace of South Bohemia landscape" or "it is element

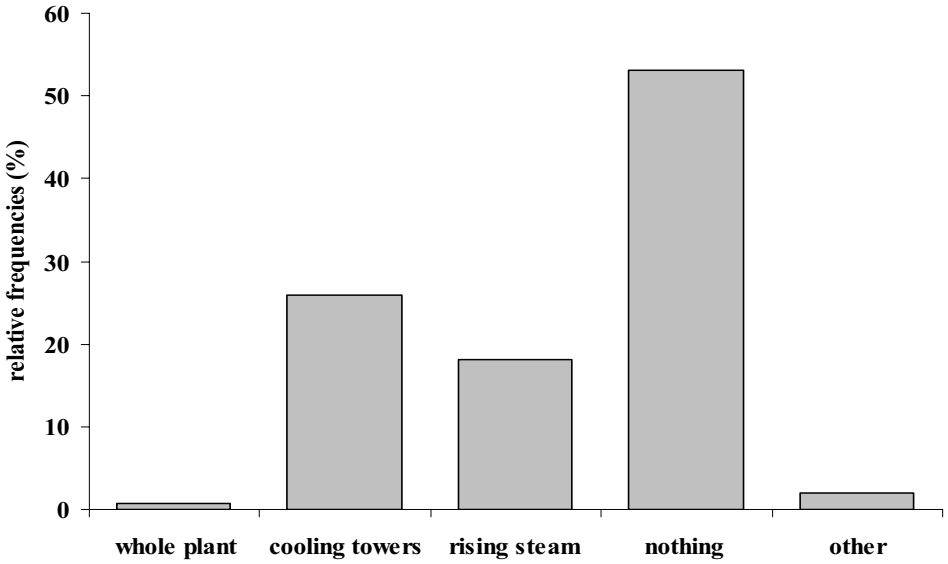

Fig. 4. Visibility of the Temelín power plant (2004).

disturbing the landscape" etc. (Bartoš et al., 2005). There is no doubt, that the construction is perceived as a profound change in landscape character, and that the perception is evidently value laden. To go further, we can even use the term of "visual contamination of environment", as it was coined by Brezina (2004) to describe the way the nuclear power plan is perceived.

The presumption as to that it is not only close vicinity to the nuclear power plant but also visual contamination of environment caused by the construction that may influence the feeling of cosiness can be documented by our empirical findings as well (Fig. 3). The research of 2003 used term "quality of life" as its reference point, which can be expressed as physical, mental and social wellness and wholesomeness. It points to a theory of SWB – "subjective well-being" (Massam, 2002). Empiric research thus tried to find out how the power plant has affected perception of individual aspects of quality of life of local population. Fig. 3 is used to illustrate the overall picture as well as the situation when individual aspects of quality of life have been influenced by two facts – when people live in a close vicinity of the power plant, and when they permanently see the power plant.

As to the sample as a whole, nuclear power plant does not have substantial effect on their quality of life. The scores oscillated more or less around zero. The only more prominent minus value of the score was associated with the dimension of mental well-being. Visibility pronounced negative scoring of mental well-being while scoring of the other spheres of quality of life sustained almost unchanged. It seems that the fact, that people

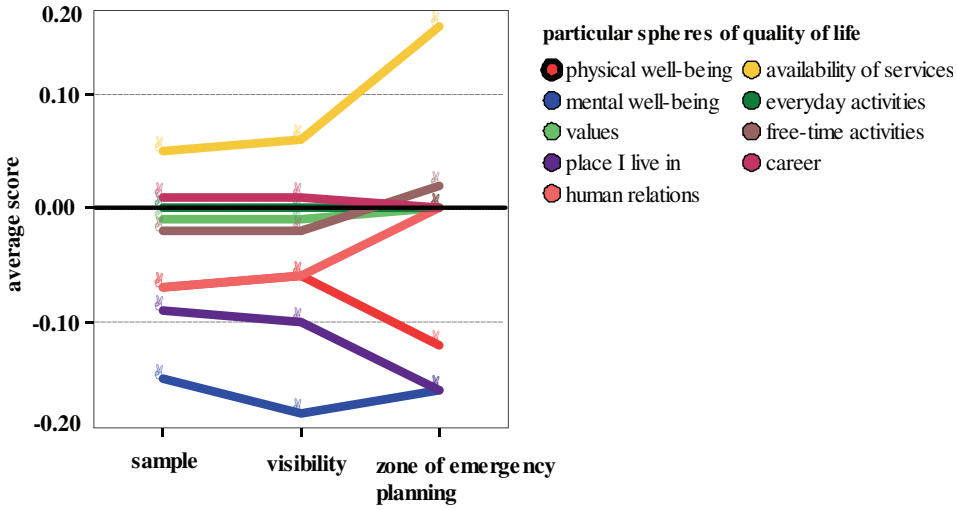

Fig. 5. Influence of the Temelín power plant on individual spheres of quality of life (2004).

permanently has to see the power plant, affects mental well-being more substantially than the fact that they live in its close vicinity (and not necessarily see it).

The effect of the "zone" is more ambiguous. At one side it pronounced a negative scoring of such spheres like place they live in, and physical well-being. On the other side we can witness increase in positive scoring in the spheres of human relations and access to services. It is far beyond mission of this article to go to the psychological depth in interpreting these outcomes. For the purpose of this study we can only conclude, together with Vaishar (1999) who did similar research in a region around nuclear power plant of Dukovany, that people are willing to accept degradation of their natural environment if these damages are (or at least are perceived to be) compensated by investments into local economy. The zone seems to be exactly the case and people living there appreciate first of all improved services available there.

Conclusion

At present, the social system seems to manifest some degree of adaptation to the given situation. The South Bohemia population has accepted the existence of nuclear power plant of Temelín. The feeling of fear seems to be transformed into the feeling of subconscious disquiet. As he most likely triggering mechanism for all the feelings of discomfort and disquiet can be seen profound changes in landscape character. The change manifest itself

in ”visual aggressiveness“ of the cooling towers of the power plant, reaching height of 155 meters, in the shape of rotary hyperboloid.

It is to be said in this context that the present state of adaptation can be taken as a very fragile one. We can say, together with Kebza et al. (2004), that any extraordinary situation related to operation of the nuclear power plant itself, or related to nuclear energy in general which would be accompanied with a negative publicity may change the situation rapidly.

Another question worth to be raised when speaking on adaptation, concerns the time to elapse till the population adapt to the change. Two time horizons differing by ten years are for sure not enough to provide us with exhaustive information. However, data mark the tendency – from an alien thing that attracts attention to a phenomenon that slowly becomes normal part of the life. We found that the nuclear power plant is, consciously or unconsciously, interpreted as a profound change of landscape character. In this context, its “acceptance” by young generation cannot be interpreted as a surprise. For the young the Temelín nuclear power plant has already became an integral part of what is poetically said to be “landscape of their childhood”, referential frame for them to define “normality”. If we arrive at this agreement, we can formulate a hypothesis as to that time the population needs to adapt to the Temelín nuclear power plant may be generation, provided nothing extraordinary happens.

Translated by the authors

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Tešitel J.: Kušová D., Bartoš M.: **Jaderná elektrárna Temelín jako výjimečná krajinná složka.**

V rurálním prostředí jižních Čech lze jadernou elektrárnu Temelín považovat za výjimečnou krajinnou složku indukující dynamiku krajinného systému. Předložený článek se zaměřuje na proces adaptace místní komunity na existenci jaderné elektrárny, konkrétně na postoje místních obyvatel k ní a komentuje změny těchto postojů během posledních deseti let. Na základě dat získaných ve dvou sociologických výzkumech (v roce 1993 a v roce 2004) lze obecně konstatovat, že místní komunita vykazuje vysoký stupeň adaptace na danou situaci. Pocit strachu a obav, který dominoval v roce 1993, se zřejmě transformoval do pocitu podvědomého neklidu. Jeho spouštěcím mechanismem je patrně "vizuální agresivita" 155 metrů vysokých chladírenských věží, jejichž silueta je, mimo jiné, vnímána i jako zásadní změna krajinného rázu.