

ECONOMIC EFFECTS TRANSMISSION EASEMENT ON AGRICULTURAL LANDS IN POLAND

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Abstract. Right of easement in Poland provide the right to use the foreign real estate by owners of transmission networks. The right transmission easement has been introduced to the Polish law by the Civil Code in 2008. The new law resulted in a large number of financial claims of property owners addressed to the network owners for payment of remuneration for use. Each transmission company must include in its budget claims of property owners. A lot of factors affect the amount of declared claims. This paper proposes a method for calculating the size of claims for all the technical infrastructure. The study used vector maps and software QGIS.

Key words: technical infrastructure, transmission, damage, utility easement.

JEL code: R39

Introduction

In Poland, the right of utility easement (limited property right) entered into force on 3 August 2008 under amendment of the Civil Code Act (Civil Code Act of 23 April 1964 (*Polish Journal of Laws* No. 16 of 1964, item 93, as amended). In Art. 305¹ – 305⁴ CC, the Act specifies the issue of utility easement. Art. 305¹ and 305² provide that utility easement is established for linear devices specified in Art. 49 §1 (devices used for supplying and disposal of liquids, steam, gas, electricity

and other similar devices) if it is required for the correct use of infrastructure devices within the determined scope in the property encumbered. Art. 305² emphasizes that if the owner of the property or the entrepreneur-owner of the infrastructure refuses to establish the easement, then the other party may demand its establishment against remuneration. The remuneration for the use of the property is a typical income subject to taxation.

Table 1

Summary of main transmission networks in Poland

Type of transferred media	Length line (km)	Type of line facility
Electricity transfer - alternative current (AC)	13,445	Overhead power lines
Electricity transfer - direct current (DC)	254	Undersea line: Poland – Sweden
Data transfer	141,239	Fibre network
Total cable network (overhead and underground)	154,938	
Gas transport	10,033	Gas pipelines
	685	Transit gas pipeline
Oil transport	1,766	Oil pipelines
Fuel transport	612	Fuel pipelines
Total pipeline network (underground)	13,096	
Total	168,034	

Source: authors' calculations based on previously conducted research (Konieczny, Kowalczyk, 2014)

It should be emphasized that a part of the infrastructure was constructed several decades ago and requires repairs or modernization. There is also a high demand for the construction of new networks. For this reason, regulation of the legal status concerning devices located within the boundaries of third-party

properties is a very important factor in the current Polish market economy. To demonstrate the scale of the problem, selected transmission infrastructure networks are briefly characterized below and distribution networks are described in a further point, without lines for connections to the real estate.

The commonly applied formula for determining the value of the right of utility easement, reflecting (Konieczny, Kowalczyk, 2014):

- establishing the area of utility easement;
- determining the degree of the co-use of the commonly used space, except for the land occupied by infrastructure devices (e.g. by poles, chambers, cabinets and other surface devices of this type), where the owner of the infrastructure uses 100 % of the occupied land;
- establishing the market rental rate for using similar devices and similarly encumbered properties (a possible situation but very unlikely for establishing) or determining the market value of the property, assuming that with a long-term use of the encumbered property, the sum of rent for using the occupied space will correspond to the value of the land occupied (Kowalczyk, 2012).

Research method

The general procedure for establishing the value of the utility easement based on the market value of the encumbered property (Konieczny, Kowalczyk, 2014)

results from formula (1) and complementary formulas, necessary to determine the unit value of the property encumbered with an unwanted infrastructure (Brown, 2005; Jäger, 2009).

$$W_{SP} = P_{SP} * k * W_1^* \quad (1)$$

$$W_1^* = W_1 * (1 - S) \quad (2)$$

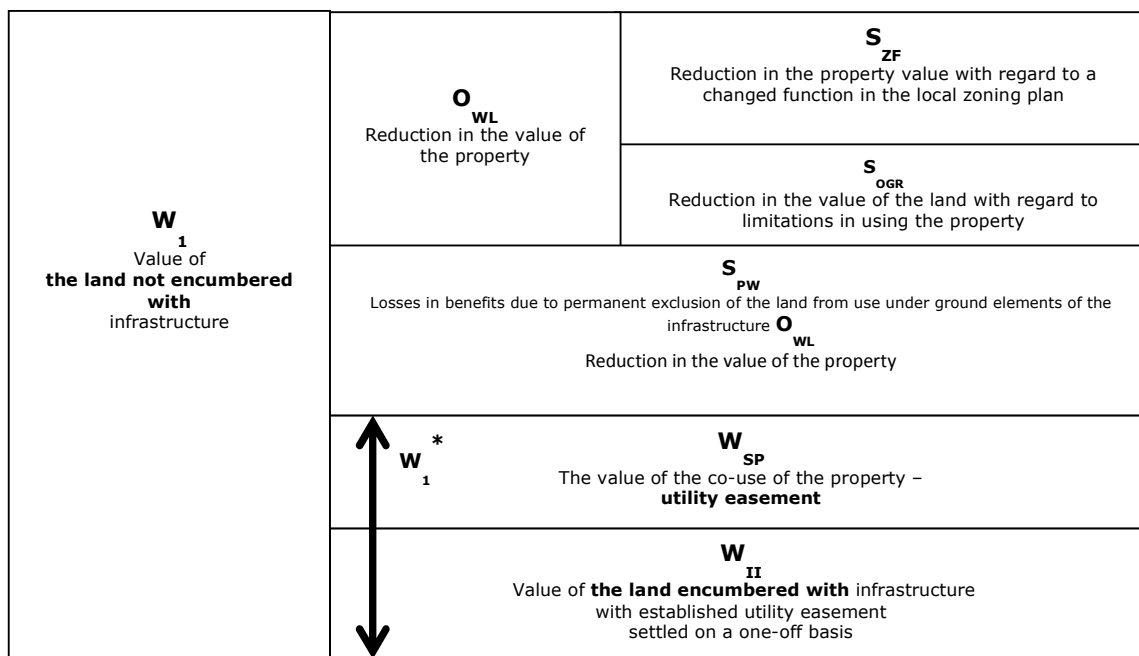
P_{SP} - area of the land for which utility easement should be established;

W_1 - market value of a comparable unit of agricultural property not encumbered with technical infrastructure (PLN/m²);

W_1^* - market value of a comparable unit of property encumbered with the existing technical infrastructure devices (PLN/m²);

S - ratio describing the reduction in the value of the property resulting from technical infrastructure undesirable for the owner or the perpetual usufruct of the property;

k - percentage share of the infrastructure owner in use of the property (index of the co-use of the property), in practice, an 0.5.



Source: Konieczny, Kowalczyk, 2014

Fig. 1. Change in the value of the property as a result of locating and operating a transmission device within the real property

As results from formula (2), the unit value of the property (plot) encumbered with the linear infrastructure should be lower than the value of the property not encumbered, by the value of damage caused by the infrastructure. A loss in the value of the

land can be expressed by a property value reduction ratio (S). It should be emphasized that an infrastructure loss will occur at the moment of establishing the location of infrastructure within a given area (planning loss) and at the moment of constructing

infrastructure devices, including surface items (a loss related to limitation in land use and exclusion of land from use). Losses related to construction of infrastructure are compensated after the completion of investment and are not taken into consideration in the case under analysis. A formula for determining the property value reduction ratio is expressed by the ratio of the value of infrastructure losses (O) to the value of the encumbered property (plot).

$$P_{1d} = [5(a+0.5)*(a+2.5) + (a+1.5)*(b+0.5)] / 10000 \quad (3)$$

where:

P_{1d} – the surface is excluded from crop (ha);

a – a long side of the bars trace (m),

b – short side of the bars trace (m).

The dimensions of physical barriers 0.2 m * 0.2 m was obtained by multiplying 11 m².

Ultimately, the transmission easement was based on the following formula:

$$W_{SP} = \sum W_1^* * P_{SP} * 0.5 + \sum W_1^* * L_{ele.naz.} * P_{ele.naz.} \quad (4)$$

$P_{ele.naz.}$ – excluded from the production area (area under the ground-based elements) – 11 m² in every element,

P_{SP} - area of the land for which utility easement should be established (m²),

$L_{ele.naz.}$ – the number of ground elements (pcs.).

Input data

The input data for the analysis are: vector data and figures. A description of the data used in the study are shown in Table 2.

Table 2

The data used in the study

Type of data	The range of data / data format	Source
Vector	Plots registration / shp	http://www.geoportal.gov.pl/
	BDOT10k (database of topographic objects) - the way land use	http://www.codgik.gov.pl/
	The axis of the pipeline / shp	http://www.codgik.gov.pl/
Numerical	Average prices of agricultural land divided into districts / xls	http://www.stat.gov.pl

Source: authors construction based on website - cited 5 January 2016

Data processing

On a layer of plots registration and data of topographic objects (BDOT10k) placed the axis of the pipeline and plotted girdle of utility easement. Width of girdle of utility easement is 4 m (for pipelines to 150 mm) and 6 m (above the pipeline 150 mm).

Based on data (BDOT10k) the land near the pipeline was divided into categories of use: agricultural land, forests, agricultural land in the distance 100 m from the residential, agricultural land in the distance up to 100 m away from industrial development, agricultural and forestry land situated within a distance of 150 m from lakes and forests, land in the immediate vicinity of

Along the gas network are elements on the ground surface (pistils). The study assumes that around pistils should be established buffer zone, which is not expected to land cultivation or other use, in order to protect the facility and lower efficiency of crops (lower yields at higher costs of cultivation).

The surface is excluded from crop was calculated using the following formula:

residential buildings in the immediate vicinity of developed industrial.

The total number of pistils was estimated based on the average number of posts per kilometer.

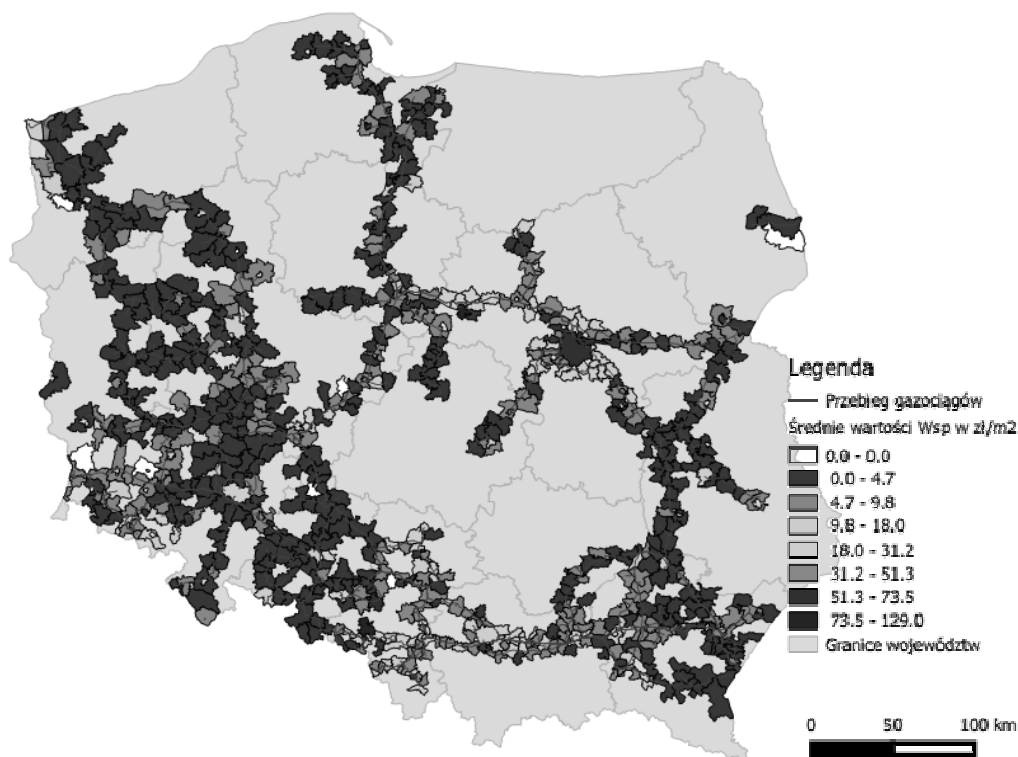
The value of agricultural land is the lowest value on the pipeline. The value of agricultural land was used as the base to determine the value of land in other categories of land. The result of analysis is shown on Figure 2. Average prices were calculated based on the prices of each category occurring in the pipeline in areas the districts

Categories of land for the pipeline transmission

Categories of land	The length of the gas pipeline (m)	Participation in the length of pipeline
Agricultural land	7 750 000	78%
Agricultural land situated within a distance of 100 m from residential	47 000	0%
Agricultural land situated within a distance of 100 m from the industrial area	709 000	8%
Agricultural and forest land situated within a distance of 150 m from lakes and forests	47 000	0%
Lands of housing	428 000	4%
Land building industrial and service	44 000	0%
Forest land *	1 024 000	10%
Land under the waters *	20 000	0%
Total	10 068 617	100%

* - excluded from the economic analysis because of other rules of obtaining rights to land

Source: authors calculations



Source: authors construction

Fig. 2. The value of land within the pipeline

Conclusions

Problems related to the determination of the value in use easements are complex since they relate to four

groups based on the data that define value. The first is the surface data. The accuracy of calculation of the area influences directly on the result of an estimate of

the transmission easement. In the present case, the surface was determined based on the vector data.

The second group of data is the data on the value of land in the municipalities.

The research estimated value of the right of transmission easements. The results are summarized in Table 4.

Approximately 90% of the test pipeline is located on the agricultural property which greatly affects the

amount of estimated salary. It makes the level of remuneration is low.

There is no doubt that the main beneficiary of the remuneration will be owners of agricultural property

The height of the total cost of establishment of limited property rights (right of transmission easements) must be an important part of the budget of the company (owner of the network infrastructure).

Table 4

Remuneration for the establishment of transmission easements on particular categories of land

Categories of land	The value of transmission easement
Agricultural land	EUR 24 974 000
Forest land	not tested
Agricultural land situated within a distance of 100 m from residential	EUR 28 861 000
Agricultural land situated within a distance of 100 m from the industrial area	EUR 2 301 000
Agricultural and forest land situated within a distance of 150 m from lakes and forests	EUR 1 949 000
Lands of housing	EUR 27 579 000
Land building industrial and service	EUR 3 358 000
Land under the waters	not tested
Total	EUR 89 022 000

Source: authors calculations

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