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Easement right valuation for electric power tranmission lines

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ABSTRACT

Expropriation costs in power transmission line projects reach quite high amounts. Expropriation on these lines is done in two ways as property expropriation and easement right expropriation. Property expropriation is carried out for pylon places and transformer stations. Easement rights are established in cases where an energy transmission line passes over the parcel. In this case, there is no loss from ownership but there is a restriction on usage. For this reason, the decrease value is determined for easement rights and this decrease is paid to the owner. In this contribution, the studies have been carried out on which factors affect the amount of decrease and how the decrease should be determined. For this purpose, factors affecting decrease rate were determined together with their weights, and scoring principles were developed for each factor. Later, a sample application was made to explain the issue and the determined price was compared with the court fee and market value.

1. INTRODUCTION

Generating and transmitting electrical energy both in Turkey and in the world has become a very important goal. The transmission of the generated electricity to users is provided by establishment of substations that enable high voltage electricity to be made suitable for use and by establishment of energy transmission lines that enable transmission of the generated electricity to these substations. When these facilities are established, very high construction costs arise. In addition to all these costs, expropriation costs also constitute an important item. If there is a pylon place or transformer stations in the parcel, these areas are divided from the parcel and expropriated completely; but under transmission line wires easement right is established.

The price to be paid for the right of easement is the decrease caused by this right in value of parcel (Kamulaştırma Kanunu 1983). In Turkey, there is no law or regulation regarding which variables will be taken into account for value decrease of parcel because of the easement right. Both the electricity company valuation commission and the court experts take the Supreme Court decisions into consideration for calculation of the decrease. According to the decisions of the Supreme Court, easement right affects value of the parcel at most 50% in zoned parcels. In agricultural lands, this value is taken as maximum 35% (Yıldırım 2018). In this case, the expropriation value of parcel

because of easement right (i.e. easement price), is calculated by using the formula;

$$EP = EA.PV.DC \tag{1}$$

where, *EA* is easement area, *PV* is parcel value per unit m² and *DC* is decrease coefficient. As stated above, DC (Decrease Coefficient) must be at most 0.50 for zoning parcels and 0.35 for agricultural parcels. However, the most important thing to remember is that these values are generally accepted maximum values. In other words, the rate of decrease that will occur in parcel due to the establishment of easement should be determined by taking into account the type, nature, use of the parcel, nature of right of easement (pipeline, electric power transmission line etc.), the area and location covered by the easement in the property and direction of easement (Köktürk and Köktürk 2016). However, this coefficient is taken as 0.50 without taking into account the factors affecting decrease rate in the valuation reports prepared by court experts. Even in agricultural lands, maximum 0.35 rule is not followed. Even worse, in some of the expert reports, the decrease coefficient is taken as 0.50 without taking the easement area into account. When the valuation reports are prepared as stated above, the cost to be paid for easement right is determined to be quite high, which causes a serious waste of public resources, a considerable increase in

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costs of energy investments and unjustified enrichment in terms of real estate owners.

In this study, it is aimed to determine the maximum value that this variable should take according to the factors affecting decrease rate. While determining decrease rate, each factor affecting the decrease is evaluated in order to obtain the decrease coefficient.

2. METHOD

In this study, first of all, factors affecting the impairment of easement right were determined by technical personnel who work for Turkish Electricity Transmission Company (TEİAŞ) as Geomatics Engineer, Agricultural Engineer and City Planner and are expert in field of valuation. Then, for each of the factors affecting the decrease, weights were determined. Then scoring were made for each factor. This approach is called nominal valuation method(Yomralıoğlu 1993). Finally, using the nominal valuation method with the help of these factor weights, decrease coefficient (*DC*) can be calculated with the following formula:

$$DC = (\sum_{i=1}^{n} W_i P_i)0.50 \tag{2}$$

$$P_i = \frac{p_i}{10} \tag{3}$$

where, W_i is weight of each factor, P_i is value of points and p_i is points awarded for each factor. Note that, since scoring made over 10 points, when calculating P_i value, p_i is divided by 10. (0.50) is maximum decrease rate used in Supreme Court decisions for zoning parcels. The easement value is determined by using formula (1).

Factors affecting decrease rate and their weights are explained below:

i-) Building Area Affected by Energy Transmission Line

The weight of this factor is determined as 15%. Buildings built on the parcel are often not affected by the passage of the energy transmission line. Even wires of the line do not pass through the building in any way. The passage of line over the parcel can only be understood from the right of easement registered in the land registry.

The ratio of the building area affected by easement right to total building area is determined as a percentage. One point is allocated for every 10% unit affected. That is, for 0%-9% 1 point, for 10%-19% 2 points, 20%-29% 3 point and so on. For example, since 20% of building on the parcel is affected in Figure 1 (a), the score to be given for this factor is determined as 3. In Figure 1 (b), since almost all of the building is affected, 10 points have been allocated.

(a)
Total Bulding Area:75 m²
Affected Building Area:15 m²

(b)
Total Building Area:353 m²
Affected Building Area:350 m²
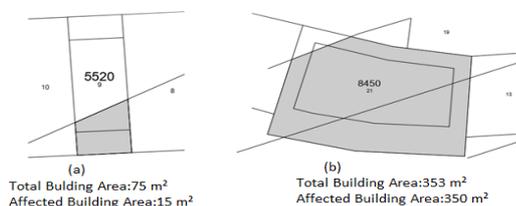
Figure 1. Example of affected building area

ii-) Possible Building Area

The most important factor that determines the decrease of easement right is determination of the building area that can be made before the electric power line crossing on the parcel and the building area to be made after power line crossing. In other words, the amount of lost from the area of the building to be built in normal conditions determines the depreciation. The weight for this factor is set as 35%.

In order to score the effect of this factor, the ratio of the building area to be built in normal conditions and the area lost when the easement right will be registered is calculated as a percentage. Pointing system is determinded as follows:

0%<ratio of lost<10% 2 points; 11%<ratio of lost<25% 4 points; 25%< ratio of lost<50% 6 points; 50% <ratio of lost<60% 8 points and ratio of lost>60% 10 points are allocated. If lost is more than 80%, the option of expropriating entire parcel should be considered.

The most important factor that can affect building area loss is the height of electric power transmission lines passing over the parcel. There are two different types of electric power transmission lines constructed by TEİAŞ, 154 kV and 380 kV. The building to be built under the 154 kV line can approach to wires maximum 5 m vertically. In 380 kV lines, this distance has been determined as 8.70 m. While issuing a building permit, municipalities have to get opinion from TEİAŞ. When asked for opinion, TEİAŞ Mapping Unit sends maximum possible building height to the municipality with an official letter. For TEİAŞ opinion, measurements required in the field should be completed when necessary. The building license is prepared by municipalities according to the information sent by TEİAŞ. When a valuation report is made either by valuation commission or by court experts, the building area that can be built and lost should be determined in consultation with the municipalities.

iii-) Size of the Parcel

The larger the parcel, the less the line crossing will affect the parcel. The weight for this factor was determined as 10%. By calculating affected area of the parcel as a percentage, starting from 1 point in the range of 0-9%, 1 point increase has been made in every 10% segment. In Figure 2, assume that, the area of parcel *A* is 3500 m² and the area of parcel *B* is 276 m². Easement right of 150 m² is registered on both parcels. Parcel *A* is affected about 4%, while parcel *B* is affected about 54%. This means that the decreaase rate for two parcels cannot be the same. The point to be given for easement right in *A* parcel is 1 point, since the rate of affection for this parcel is between 0% and 9%. However, the ratio affection for *B* parcel is 54%, that is, the ratio is between 50% and 59%, so for this factor it is allocated 6 points.
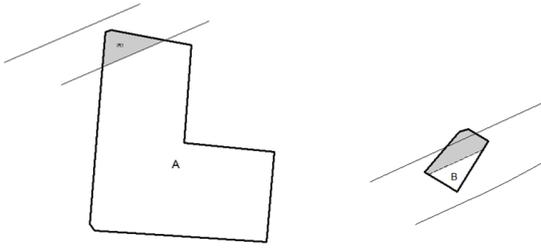
Figure 2. Example of property size
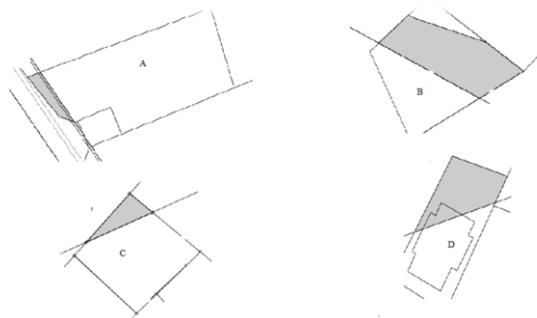
iv-) Easement Shape

The weight of this factor is determined to be 25%. If power line passes through the edge of the parcel, building on property will not be affected much. However, when the line crosses the middle of the parcel, building on it will be affected more. The passage of the line is important in terms of affecting the shape of the new parcel. Scoring should be made after these situations are taken into account.

In Figure 3, easement right passing over parcel *A* does not have any effect on the building to be built on the parcel, but the easement separates the parcel in two pieces and allows the formation of a properly shaped building in the remaining parcel.

Since the parcel the parcel has a smooth geometric feature, 1 point can be allocated for the *A* parcel. When parcel *B* is examined in Figure 3, it is seen that if the easement area is removed, one of the remaining parts will not be suitable for construction because it is triangular and small, and the other part is divided into a trapezoid shape. For this reason the score can be allocated is determined as 8 points.

When the easement area is removed in parcel *C* in Figure 3, it has been determined that although a trapezoid shaped parcel remains, it does not affect the shape of the building to be built. So, 2 points can be allocated for this factor.

When parcel *D* is examined in Figure 3, it is seen that the shape remaining after the easement is trapezoidal, for this reason 5 points can be allocated.
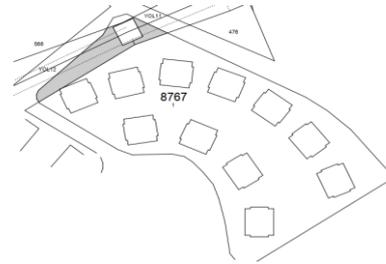

Figure 3. Example of easement shape

If there is a pylon inside the parcel, the parcel shape will often have a broken structure after being divided. In such a case, the shape factor of the line should be scored by considering both the line crossing and pylon location. If the parcel is large, the pylon location may not affect the building that can be built on the parcel. But if the parcel is small and it is not possible to use remaining parcel, paying depreciation may not save the situation. In this case, in accordance with Article 12 of the Turkish Expropriation Law, the entire parcel can be expropriated (Kamulaştırma Kanunu 1983). When making a valuation for the parcel with a pylon in it, the passage of the pylon location through the parcel as a percentage and the way the line passes will be considered together. It can be evaluated in terms of shape, depending on whether there can be made any building or not.

In Figure 4, the pylon passed over a very large parcel, and turned the parcel into a very fractured structure**.** However, it is observed that this situation does not affect the buildings to be built on the parcel in any way. Since the remaining part of the parcel will have a broken structure, 5 points have been allocated and 1 point has been added for the transition of easement. A total of 6 points have been allocated for the power transmission line crossing in this parcel.


Figure 4. Example of easement shape with pylon

v-) Psychological Factors and Health Effects

The weight of these factors was determined to be 15%. First of all, the fact that the right of easement is registered in the title deed of the parcel will cause reluctance to purchase this parcel in markets where there is a balance of supply and demand, or where demand is less than supply. If the demand is higher and supply is lower, fewer points can be allocated for decrease. When the owner want to withdraw a loan by showing a mortgage on the parcel where the easement right is held, banks generally either do not give any credit or demand for opinion of TEİAŞ. This may cause both time and money loss. If there is an expropriation annotation in the title deed, the owner cannot sell his or her parcel before expropriation process is totally completed. Considering all these situations, it is assumed appropriate to allocate a minimum of 5 points for each parcel to be expropriated. The remaining five points can be allocated over the percentage of the area covered by the easement right on the land. In other words, if the percentage of easement is between 0% and 10%, 1 point; if it is between 11% and 25%, 2 points; if it is between 26% and 50%, 3 points; if between 51% and 60%, 4 points, and 5 points for more than 60% can be allocated.

3. SAMPLE CALCULATION

Our scoring system described above has been implemented on a sample parcel. For this, the expropriation of easement rights on a parcel located within the borders of Pendik district of Istanbul province is taken as an example (Figure 5).
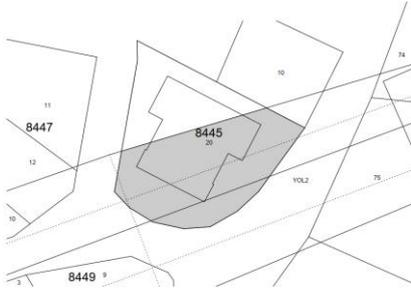
Figure 5. Parcel to be applied

The area of the parcel in the Figure 5 is 645.89 m², and 421.63 m² of easement is passed over it. A 250 m² building can be built on the parcel. 162 m² of this building is affected by the easement. In the valuation made by the court, the decrease rate is accepted as 50%. The price per m² for the parcel has been determined as 3400 ₺/m². From here, the price per m² of the easement right has been determined as 1700 ₺/m². The expropriation value of easement right is calculated as 1700 ₺/m² x 421.63 m² = 716,771.00 ₺.

The following results are obtained by calculating according to the factors specified in the study.

1. <u>Affected building area</u>: $162m^2/250m^2 x100 = 64.8$ %. So, 7 points is allocated.

2. <u>Building area that can be built</u>: The building is not affected vertically in this area at all, so 2 points have been allocated.

3. <u>Parcel size</u>: Approximately 65% of the property is affected by the energy transmission line. So, 7 points have been allocated.

4. <u>The way the easement passes through the parcel</u>: Approximately 65% of the property is affected by the energy transmission line. A properly structured parcel is not formed in the part remaining from the energy transmission line. In addition, an independent building cannot be built on the remaining parcel. So, 10 full points have been allocated for this factor.

5. <u>Psychological factors and health effects</u>: for more than %65 of the property is affected by the easement right 10 points have been allocated for this factor.

By using formula (2) and (3):

$$DC = (0.7x0.15 + 0.2x0.35 + 0.7x0.10 + 1.0x0.25 + 1.0x0.15)x0.50 = 0.645\ x0.50 = 0.3225$$

The expropriation value of easement right can be calculated with Eq.(1) as:

$$EP = 421.63\ m^2 x 3400\ ₺/m^2\ x\ 0.3225 = 462,317.29\ ₺$$

In the study conducted in the real estate market where the parcel is located, the decrease rate was determined to be between 0.30-0.35%. By taking the arithmetic mean of these two values, the rate of impairment will be 0.3250. The obtained value of the handled parcel with different approaches is given Table 1.

Table 1. Data for comparaison

Calculation Type	Decrease Rate	Value (₺)
Court	0.5000	716,771.00
Real Estate Market	0.3250	465,901.15
Nominal Method	0.3225	462,317.29

When the values in Table 1 were compared, it is seen that the market value and nominal value are very close to each other. However, there is a huge difference between these two values and the court value. This causes financial loss of public resources. Furthermore**,** the owner of the parcel will also receive more than should be received.

4. CONCLUSION

For electric power transmission lines, expropriation expenses are extremely high. This is especially because of the easement rights prices. In this study, factors affecting easement right price are examined and a valuation model is proposed. This model is applied on an example parcel and compared with court and market prices. It is hoped that this study could provide a guide in determination of easement prices and in studies of making law and regulations.

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