

Change of Income from Forest Products based on Geographical Location of Enterprises and some Marketing Variables

Orman Ürünlerinden Sağlanan Gelirlerin İşletmelerin Coğrafi Konumu ve Bazı Pazar Değişkenlerine Göre Değişimi

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Abstract

The Turkey forest products market losing its monopoly property has led to a reduction in the income of General Directorate of Forestry (GDF). Forest Enterprises Directorate (FED) regulate the wood sale revenue separately and the success level of each managements is considered as separately. In this study, some factors affecting the sale price of wood based products for General Directorate of Forestry are analyzed. In this context, the results of the 5-year wood sale revenue sale auctions between the years 2014-2018 of 2 Regional Directorate of Forests (RDF), which are close to each other in terms of geographical location, and 21 FEDs operating under them are analyzed. Evaluations were conducted on the basis of stumpage sales and traditional warehouse sales practices. The research results showed that there are statistically significant ($p<0.05$) differences on the sales revenues of the GDF due to accession rate of appraised value consisting of the RDF, FED, stumpage sales or traditional warehouse sales, and the year and month variables in which forest products are offered for sale. Likewise, it has been detected that the proximity of FEDs, which regulate wood-based product sales, to the high-capacity forest products industry managements in terms of accessibility with regard to geographical location has a significant effect on sales revenues.

Keywords: Accession Rate of Appraised Value, Geographical Proximity, Stumpage Sales, Warehouse Sales

Öz

Türkiye orman ürünleri pazarında tekel özelliğini kaybetmesi Orman Genel Müdürlüğü'nün gelirlerinin azalmasına neden olmuştur. Devlet Orman İşletme Müdürlükleri (DOİM) odun emvali satış ihalelerini münferit olarak düzenlemekte ve her işletmenin başarı düzeyi yine münferit olarak değerlendirilmektedir. Bu çalışmada, Orman Genel Müdürlüğü'nün odun esaslı ürünler için satış fiyatını etkileyen bazı faktörler analiz edilmiştir. Bu kapsamda, coğrafi konum yönünden birbirine yakın 2 Orman Bölge Müdürlüğü ve bunlara bağlı olarak faaliyet gösteren 21 DOİM'in 2014-2018 yılları arasındaki 5 yıllık odun emvali satış ihalesi sonuçları incelenmiştir. Değerlendirmeler dikili ağaç satışı ve geleneksel depodan satış uygulamaları temelinde gerçekleştirilmiştir. Araştırma sonuçları, Orman Bölge Müdürlüğü, DOİM, satışların dikili ağaç satışı veya geleneksel depo satışları olması, orman ürünlerinin satışa sunulduğu yıl ve ay değişkenlerinin oluşan Muhammen Bedel Artırma Oranı dolayısıyla Orman Genel Müdürlüğü'nün satış gelirleri üzerinde istatistiksel düzeyde anlamlı ($p<0.05$) farklılıklar oluştuğunu göstermiştir. Benzer şekilde, odun esaslı ürün satış ihalesi düzenleyen DOİM'lerin ulaşılabilirlik yönünden coğrafi konum itibarıyla yüksek kapasiteli orman ürünleri endüstrisi işletmelerine olan yakınlığının elde edilen satış gelirleri üzerinde önemli düzeyde etkisinin bulunduğu tespit edilmiştir.

Anahtar kelimeler: Muhammen Bedel Artırma Oranı, Coğrafi Yakınlık, Depodan Satış, Dikili Satış

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1. Introduction

The sustainability of forest resources around the world has become a rapidly developing issue after the 1990s. In addition to the sustainability of the forest assets, the supply enough to meet the forest products demand and the continuity of the sales revenues that would be obtained are also important. On the other hand, many studies have been concluded that reached to the conclusion that the forest products supply should be regulated according to market demand (McKillop, 1967; Leuschner, 1973; Robinson, 1974; Buongiorno, 1977; Buongiorno, 1978; Kayacan et al., 2012). Changing market conditions and consumer behavior indirectly affect forest enterprises (Halaj et al., 2018). Wood based products are the most important source of income for forest enterprises (Sujová et al., 2017).

The wood based raw material production in manufacturing of forest resources in Turkey has been considered as the main purpose of General Directorate of Forests (GDF) until the recent past. Therefore, developing the qualification of these products, the activity and efficiency aspects of actions were ignored. However, developing market conditions have increased the importance of these issues for forest industry managements (Sedjo and Sohngen, 1996; Öztürk et al., 2011).

The wood raw material supply of Forest Enterprises Directorate (FED) within the structure of Regional Directorate of Forests (RDF) also constitutes the main output of the revenue plans based on the sustainable management approach of forest resources. On the other hand, disasters such as natural disasters, storms and fires are known to have an impact on the supply of wood raw materials. Especially changes in the construction sector, furniture and paper industry and the process with ups and downs due to the general economic situation are an important factor on the demand for wood raw materials. In the current market conditions, it is important that wood based raw material and semi-finished producers concentrate on developing new resources and methods that can minimize the impact level from environmental factors (İlter and Ok, 2007; Özler, 2013).

Foreign trade policies, which have been implemented after the 1990s in Turkey, distracted FEDs away from the position of being the only supplier of forest products and reductions in income of these manufactures has been occurred. Especially in the marketing of wood-based forest

products which are not possible for FEDs to remove from product mix, new quests have become inevitable. Losing monopoly feature of GDFs, which are given manufacturing of forest products in Turkey by laws, has increased the importance of the wood raw material production, creation of product mix suitable for the market, cost and pricing, distribution and promotional activities (İlter, 1985; Türker, 1996; Demirel, 2006; Komut, 2011).

This study aims to evaluate the change of the accession rate of appraised value according to some factors in auction sales for 2 different and adjacent RDFs and affiliated FEDs in comparison with stumpage sales and warehouse sales applications. Evaluation variables were determined as; RDF, FED, years, months and proximity to important industrial facilities.

2. Materials and Methods

Amasya RDF and Giresun RDF, which are similar in terms of climate and habitat characteristics and have geographical proximity, were selected as the study area. Both RDFs have similar characteristics in terms of management scale and operation area of forest industry managements that constitute their target markets.

There are 11 FED within Amasya RDF and 10 FED in Giresun RDF. FEDs in Amasya RDF responsibility area are as follows; Bafra, Vezirköprü, Samsun, Kargı, İskilip, Amasya, Çorum, Erbaa, Tokat, Niksar, Almus (Figure 1). FEDs in Giresun RDF responsibility area are as follows; Akkuş, Ünye, Ordu, Giresun, Dereli, Espiye, Tirebolu, Mesudiye, Koyulhisar, Şebinkarahisar (Figure 1). The forest industry facility with the highest capacity in Amasya RDF responsibility area is located in Vezirköprü FED responsibility area. The forest industry facility with the highest capacity in Giresun RDF responsibility area is located in Ordu FED responsibility area. Other FEDs are grouped as to first degree and second degree close according to accessibility criteria (Figure 1).

In this study, data on Amasya and Giresun RDF's stumpage sales and traditional warehouse sales concerning 2014-2018 wood assets sales and auction sales were utilized. Data for the period in question was obtained from Amasya RDF and Giresun RDF records. There are significant differences between the forest area sizes of both RDFs. However, the amount of stumpage sales and industrial wood sales in 2018 are similar (Table 1) (OGM, 2019b).



Figure 1. Study area and FED distribution (OGM, 2019a)

Table 1. General characteristics of sample RDFs

RDF	General Forest Area (ha)	Stumpage Sales (m ³)	Industrial Wood Sales (m ³)	Firewood Sales (Ster)
Amasya	1 529 275	263 000	994 000	338 000
Giresun	560 810	242 000	729 000	96 000
Total	2 090 085	505 000	1 723 000	434 000

Years, months and the Accession Rate of Appraised Value (ARAV) based on FED are determined with Equation 1 for the stumpage sales and traditional warehouse sales auctions on the basis of RDFs.

$$ARAV = \left[\frac{SP - AV}{AV} \right] \times 100 \tag{1}$$

Where ARAV is accession rate of appraised value (%), SP is sales price (\$/m³), AV is appraised value (\$/m³).

SPSS package program was utilized for statistical comparisons between ARAVs estimated in the study. Kolmogorov-Smirnov Test was applied to the obtained data and the data was determined to show normal distribution. Therefore, parametric

tests were applied in the analyses. According to this, one-way analysis of variance (ANOVA) was used in comparisons where dependent and independent variables were present and the number of variables was above two. One of the non-parametric tests, Mann-Whitney U Test was used in comparisons with two independent variables where the sample number was less than 30.

3. Results and Discussion

The ARAV average of Amasya RDF's stumpage sales between years 2014-2018 has been determined as 15.13%. Despite the decline in 2015, ARAV has been found to have an overall increase tendency (Table 2). The highest ARAV among FEDs has occurred in the Amasya FED.

Table 2. ARAV for Amasya RDF stumpage sales in regards to years

FED	ARAV by Years (%)					Standard Deviation	Average (%)
	2014	2015	2016	2017	2018		
Çorum	3.56	5.34	0.68	4.39	8.27	2.76	4.45
Amasya	61.54	30.68	38.85	72.03	-	19.27	50.78
Tokat	24.41	0.11	16.69	5.23	47.49	18.66	18.79
Vezirköprü	0.18	1.45	6.67	8.62	10.55	4.51	5.49
Samsun	29.96	1.78	8.67	16.65	13.44	10.49	14.10
Bafra	1.00	-	-	16.79	6.76	7.99	8.19
Niksar	1.50	-	3.25	25.07	16.74	11.25	11.64
Almus	0.18	0.18	5.29	0.08	3.52	2.42	1.85
İskilip	0.83	7.03	-	-	0.57	3.66	2.81
Kargı	0.10	0.27	0.15	7.56	35.95	15.51	8.81
Erbaa	11.57	34.20	70.19	-	42.27	24.21	39.55
Average (%)	12.26	9.00	16.71	17.38	18.56	4.02	15.13

The ARAV average concerning the stumpage sales of Giresun RDF between years 2014-2018 has been determined as 8.11%. Like Amasya RDF, ARAV has been determined to be in an overall increase tendency despite the decline in 2015 (Table 3). The highest ARAV among FEDs was observed in Koyulhisar FED.

In general, ARAV values occurred higher in Amasya RDF when compared with Giresun RDF. After the decrease in ARAV in 2015, both RDFs have showed an increase tendency. The general increase-decrease tendency in the related process was observed to be similar for both units (Figure 2).

Table 3. ARAV for Giresun RDF stumpage sales in terms of years

FED	ARAV by Years (%)					Standard Deviation	Average (%)
	2014	2015	2016	2017	2018		
Koyulhisar	40.03	-	-	0.58	-	27.90	20.31
Şebinkarahisar	-	-	-	-	0.92	-	0.92
Giresun	6.48	8.17	0.47	29.78	6.86	11.26	10.35
Ünye	6.90	1.69	5.42	2.43	8.10	2.78	4.91
Ordu	0.60	1.97	3.60	17.19	50.68	21.12	14.81
Mesudiye	31.08	6.63	4.83	8.59	18.69	10.97	13.96
Tirebolu	20.67	1.52	6.73	0.36	2.06	8.41	6.27
Espiye	12.93	1.23	1.47	5.43	-	5.46	5.27
Akkuş	-	0.56	-	-	-	-	0.56
Dereli	0.38	0.36	1.96	0.87	14.89	6.29	3.69
Average (%)	14.88	2.77	350	8.15	14.60	5.82	8.11

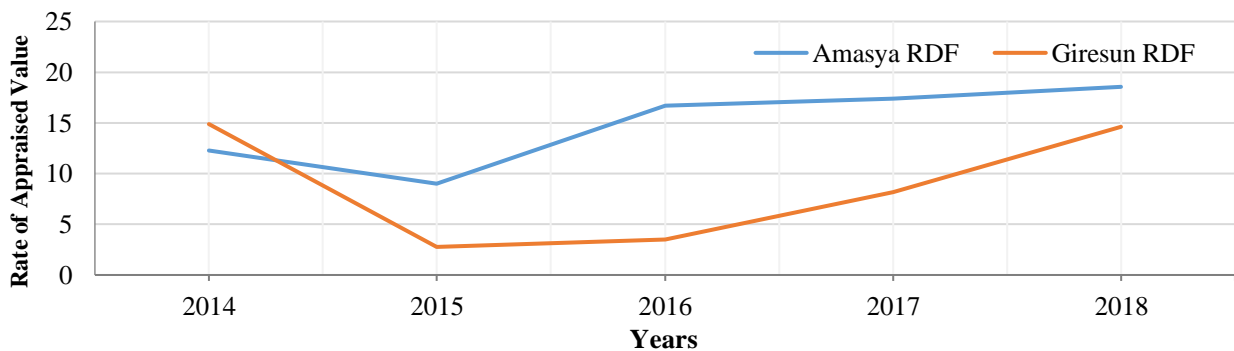


Figure 2. ARAV comparison at RDFs level

On the other hand, statistically significant differences were found between the averages of ARAV values on a monthly basis (Table 4). According to this, ARAV values in Amasya RDF have occurred higher than Giresun RDF. This

difference can be attributed to the fact that the large industrial facility in the Amasya RDF area of responsibility is a facility that produces different products such as timber, MDF, particleboard, plywood.

Table 4. Mann-Whitney U test results concerning Amasya RDF and Giresun RDF ARAV values

Factor	RDF	Number (N)	Mean Rank	Mann-Whitney U	Wilcoxon W	Z	p
ARAV	Giresun	12	8.670	26.000	104.000	-2.656	0.008*
	Amasya	12	16.330				
	Total	24					

ARAV values of Amasya and Giresun RDF's 5-year stumpage sales on a monthly basis are given in Figure 3. It is deduced that there has been an increase in ARAV values in April, May and June and a decrease tendency in sales after June is

observed. It was observed that the monthly ARAV changes which show similar characteristics in both RDFs were observed to be more pronounced in Amasya RDF (Figure 3).

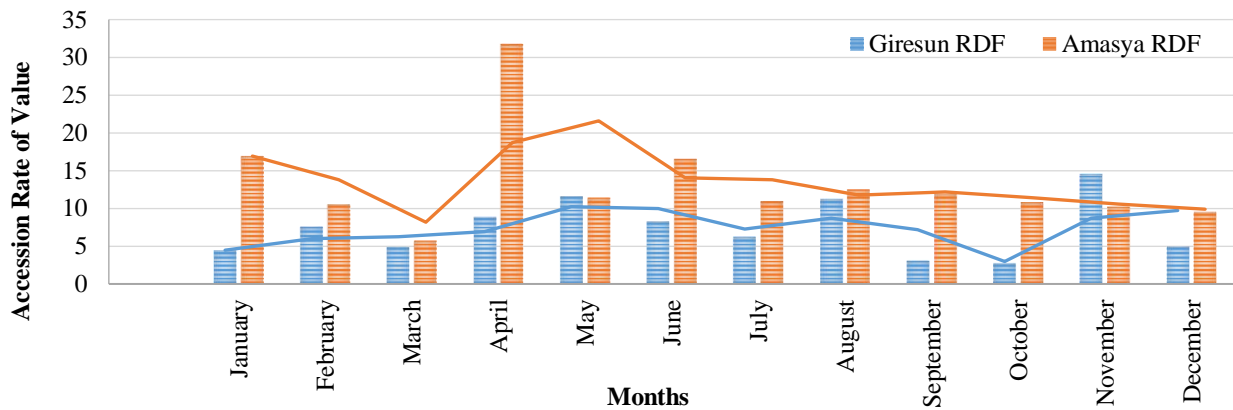


Figure 3. Average 5-year ARAV values on the basis of months

The ARAV relationship formed with 1st and 2nd degree proximity to high capacity forest industry managements and accessibility characteristics of FEDs affiliated to RDFs is given in Figure 4. According to this, it was found that products of FEDs, which are accessible in terms of forest

industry managements and considered to have low raw material transportation cost, are shown more interest towards their products. Therefore, it has been found that ARAV is formed at a higher level in FEDs which are 1st degree close to forestry managements in both RDFs.

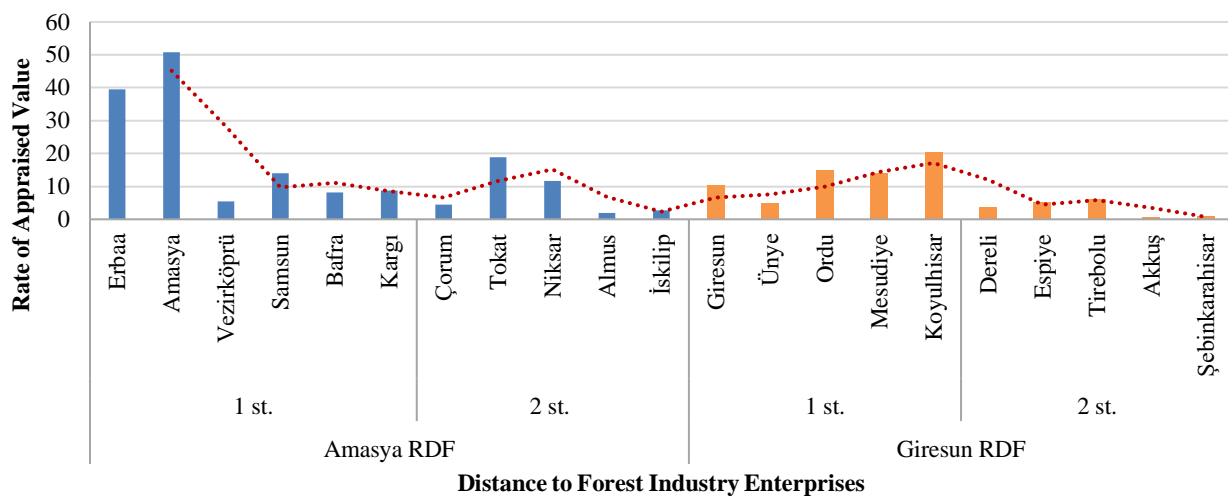


Figure 4. Relationship of distance to forest industry enterprises with ARAV

At the level of FEDs affiliated with Amasya and Giresun RDFs, timber, industrial wood and paper wood product classes sales were used as base in

the evaluation of wood based products from traditional warehouse. In the One-Way Analysis of Variance, statistically significant differences

were determined between the FEDs affiliated with Amasya RDF in terms of average ARAV value ($p < 0.05$). On the other hand, the analysis results

showed that there was no statistically significant difference between FEDs affiliated with Giresun RDF ($p > 0.05$) (Table 5).

Table 5. Results of ARAV One-Way Analysis of Variance in wood assets sales on the basis of FED

Variables	FED	N	M	F	Sig.
Amasya RDF ARAV	Çorum	9	0.203	2.105	0.032*
	Amasya	8	0.171		
	Tokat	9	0.116		
	Vezirköprü	8	0.282		
	Samsun	10	0.191		
	Bafra	10	0.348		
	Niksar	10	0.116		
	Almus	10	0.197		
	İskilip	6	0.207		
	Kargı	9	0.149		
	Erbaa	8	0.191		
	Total	97	0.197		
	Giresun RDF ARAV	Koyulhisar	3		
Şebinkarahisar		2	0.300		
Giresun		4	0.244		
Ünye		3	0.099		
Ordu		4	0.276		
Mesudiye		4	0.230		
Tirebolu		4	0.215		
Espiye		1	0.079		
Akkuş		3	0.264		
Dereli		4	0.247		
Total		32	0.229		

* $p < 0.05$

ARAV relationship with 1st and 2nd degree proximity to high capacity forest industry managements and accessibility characteristics in the traditional warehouse sales of wood based products is given Figure 5. According to this, it

was determined that proximity and accessibility to forest industry management increased ARAV value in warehouse sales, similar to stumpage sales.

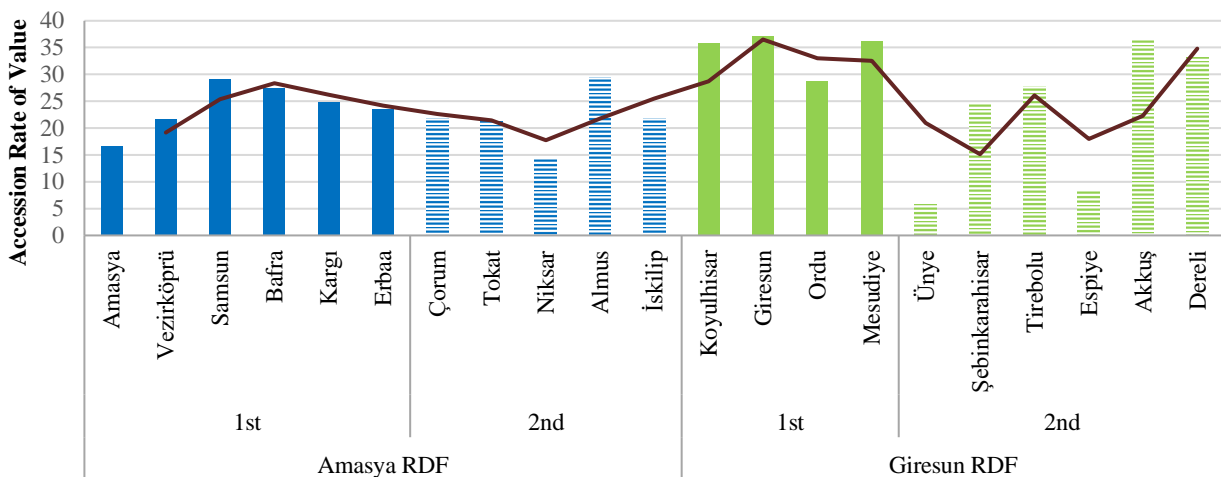


Figure 5. ARAV relationship with forest industry enterprises in warehouse sales

In this research, ARAV has been determined to be affected by the variables of RDF, FEDs within RDF, sale month and sale year. It has been stated that stumpage sales, which are developed as an

alternative to warehouse sales, have not yet been implemented efficiently and effectively and include some economic and technical problems (Daşdemir, 2011). In a study, it was reported that

the number of buyers in the stumpage sales application was lower than that of warehouse sales, thus decreasing competition and lowering the revenues of FEDs (Komut and Öztürk, 2014). There are studies stating that economic fluctuations occurring in the country and in the world markets lead to differentiation in the production and sales of wood raw materials by years (İlter and Ok, 2007; Özler, 2013; Daşdemir, 2003; Dikilitaş and Öztürk, 2010; Buğday, 2016). In a study on the subject, it was concluded that differentiating the tender times of FEDs will have an increasing effect on revenues (Ok, 1997).

The findings obtained in this study show similarities to the literature on sales revenues of FEDs. In this study, it was determined that the variables like product type, tree type, proximity to FED industrial facilities that go out to tender, and auction times variables were found to lead to significant differences in terms of revenue generated because of ARAV, which is generated by traditional warehouse sales. It was reported that FEDs produced wood-based products at different times during the year affected the production costs and sales revenues of the managements (Ok, 1997).

Another study has shown that the cost and revenue characteristics of wood-based products in FEDs' sales warehouses are influenced by the product quality as well as the distance to forest industry enterprises that are buyers of these products (Türker, 2013). In addition, many studies have been conducted stating that the supply of forest products should be planned according to the demand in the market (McKillop, 1967; Leuschner, 1973; Robinson, 1974; Buongiorno, 1977; Buongiorno, 1978; Kayacan et al., 2012). Studies prove that the prices of forest products depend on the supply-demand balance in the market and consumption of wood products per capita (Zivnuska, 1955; Holland, 1960; Kayacan and Öztürk, 2009). On the other hand, it has been reported that the effect of aspects like obtaining high revenue in forest products marketing, auction times, the status of forest industry managements and seasonal changes on the prices should be determined with the right strategy (Trømborg et al., 2000). In addition, it is reported that volatile supply and demand in the markets in the future necessitates efforts to increase the flexibility of the forestry sector (Jonsson, 2011; Sahoo et al., 2019; Poudyal et al., 2019). However, it is reported that GDF cannot act independently on pricing of forest products based on market and cost conditions (Daşdemir, 2003).

4. Conclusions

The results of the research showed that the variables of RDF, FED, auction year, auction month and proximity to forestry industry managements had an impact on ARAV formed as a result of the auction and significantly differentiated the revenue obtained.

Evaluations conducted have emerged the product types and procurement policies required by forestry industry managements as an important factor affecting the income generated by FEDs from forestry product sales. It has been observed that transportation costs have significant effects on purchasing decisions of these managements as well as product price. As the proximity and accessibility to forestry industry managements in terms of geographical location of the products supplied to the market increases, the potential to generate more revenue also increases.

The results of the study clearly showed that RDFs should actively use the coordination function in order to enable the FEDs to act jointly with respect to the times of wood assets auctions. On the other hand, in order for GDF to increase its sales revenues, it is found necessary to make plans for the auction time at RDFs level.

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