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Gordana Slavković*, Mile Bugarin*, Radojka Jonović*

EKONOMSKE PROJEKCIJE VALORIZACIJE BAKRA IZ OŠTRELJSKIH PLANIRA I STAROG FLOTACIJSKOG JALOVISTA**

Izvod

Ekonomске projekcije se zasnivaju na stručnom sagledavanju godišnje valorizacije bakra iz Oštreljskih planira i starog flotacijskog jalovišta za narednih deset godina u cilju okvirnog sagledavanja isplativosti proizvodnje ukupnog kapaciteta oko 3040 t katodnog bakra na osnovu složenih tehničko tehnoloških istraživanja. Preliminarna ekonomska sagledavanja pokazala su visoko pozitivne rezultate uspešnosti i isplativosti kroz bilans uspeha, ekonomski novčani tok, cenu koštanja itd.

Gljučne reči: valorizacija bakra, rezultat, uspešnost, isplativost

1. UVOD

1. Na osnovu definisanih tehničko tehnoloških rešenja valorizacije bakra iz Oštreljskih planira i starog flotacijskog jalovišta, procenjena ukupna investiciona ulaganja u osnovna sredstva iznose: 13.495.000 USD.

- Iznos ukupnog kredita 12.500.000 USD
- Rok vraćanja kredita je 8 godina, kamatna stopa je 10% godišnje, jednaki godišnji anuitet

Tabela 1. Ukupna investiciona ulaganja i konstrukcija finansiranja u 000\$

I. UKUPNO OSNOVNA S.	13495	13495
OBRtnA SREDSTVA	3200	3200
UKUPNE INVESTIC.	16695	16695
II. IZVORI		
1. Sopstvena sred.	4195	4195
2. Krediti	12500	12500
UKUPNI IZVORI	16695	16695

* Institut za rudarstvo i metalurgiju Bor

** Ovaj rad je proistekao iz Projekta broj 37001 "Uticaj rudarskog otpada iz RTB-a Bor na zagađenje vodotokova sa predlogom mera i postupaka za smanjenje štetnog dejstva na životnu sredinu" koji je finansiran sredstvima Ministarstva za prosvetu i nauku Republike Srbije

Tabela 1.1. Plan otplate kredita

u 000\$

NAZIV KREDITA: KREDIT 1		USD: 500.00		
USLOVI: ROK: 5 KAM.: 10.000%				
1	132	50	82	500
2	132	42	90	418
3	132	33	99	328
4	132	23	109	229
5	132	12	120	120
Tot:	660	160	500	
Pros:	132	32	100	
NAZIV KREDITA: KREDIT 2		USD: 12000.00		
USLOVI: ROK: 8 KAM.: 10.000%				
1	2249	1200	1049	12000
2	2249	1095	1154	10951
3	2249	980	1270	9796
4	2249	853	1397	8527
5	2249	713	1536	7130
6	2249	559	1690	5594
7	2249	390	1859	3904
8	2249	204	2045	2045
Tot:	17992	5994	12000	
Pros:	2249	749	1500	
UKUPNO	18652	6154	12500	

2. OBRAČUN PRIHODA

Prihod je obračunat na bazi planiranih količina katodnog bakra i prodajnih cena .

Tabela 2. Obračun prihoda

u 000\$

PROIZ-	PRODAJNA	UKUPNI	PRIHOD	CIST	
VOD	KOLICINA	CENA	PRIHOD	DALJE PRERADE	PRIHOD
* GODINA:	1-10				
1 Cu	1500.0000	4.2000	6,300.00	0.00	6,300.00
1 Cu	1540.0000	4.2000	6,468.00	0.00	6,468.00
** GODISNJI PRIHOD			12,768.00	0.00	12,768.00
* UKUPNI PRIHOD			127,680.00	0.00	127,680.00

3. CENA KOŠTANJA

1) Ukupna cena koštanja 3.040 t katodnog bakra godišnje.

Tabela 3. Ukupna cena koštanja

u 000 \$

GODINE	1	2	3	4	5	6
1. Sirov.i mater.	2620	2620	2620	2620	2620	2620
2. Energija	182	182	182	182	182	182
- Elektriika	182	182	182	182	182	182
3. Održavanje	1271	1271	1271	1271	1271	1270
4. Amortizacija	1501	1501	1501	1501	1501	1496
5. Ostali mat.tr.	1000	1000	1000	1000	1000	1000
6. Nemater.trosk.	800	800	800	800	800	800
7. Licni dohoci	420	420	420	420	420	420
8. Kamate	1250	1137	1012	876	725	559
9. Osiguranje	270	270	270	270	270	269
I. TROS.POSLOVANJA	9313	9200	9076	8939	8788	8616
10. Zakonske obav.	345	357	369	383	398	415

-NASTAVAK	7	8	9	10	UKUPNO	PROSEK
1. Sirov.i mater.	2620	2620	2620	2620	26200	2620
2. Energija	182	182	182	182	1815	182
- Elektriika	182	182	182	182	1815	182
3. Održavanje	1270	1270	375	375	10914	1091
4. Amortizacija	1496	1496	751	751	13495	1350
5. Ostali mat.tr.	1000	1000	1000	1000	10000	1000
6. Nemater.trosk.	800	800	800	800	8000	800
7. Licni dohoci	420	420	420	420	4200	420
8. Kamate	390	204			6154	615
9. Osiguranje	269	269	150	150	2458	246
I. TROS.POSLOVANJA	8447	8261	6298	6298	83236	8324
10. Zakonske obav.	432	451	647	647	4444	444
II.PUNA CENA KOST.	8879	8712	6945	6945	87681	8768

Prosečna cena koštanja iznosi: 2884,2 USD/T KATODE

4. BILANS USPEHA

Tabela 4. Bilans uspeha

u 000 \$

GODINE	1	2	3	4	5	6
A. UKUPNI PRIHOD	12768	12768	12768	12768	12768	12768
B. UKUPNI RASHODI	9313	9200	9076	8939	8788	8616
1.POSLOV.RASHODI	8063	8063	8063	8063	8063	8057
-Mater.troskovi	2620	2620	2620	2620	2620	2620
-Energija	182	182	182	182	182	182
-Održavanje	1271	1271	1271	1271	1271	1270
-Osiguranje	270	270	270	270	270	269
-Amortizacija	1501	1501	1501	1501	1501	1496
-Usl.i ost.mat.	1000	1000	1000	1000	1000	1000
-Nemater.trosk.	800	800	800	800	800	800
-Licni dohoci	420	420	420	420	420	420
2.RASHODI FINANS.	1250	1137	1012	876	725	559
-Kamata	1250	1137	1012	876	725	559
C. BRUTO DOBIT	3455	3568	3692	3829	3980	4152
-Porezi i dop.	345	357	369	383	398	415
E. NETO DOBIT	3109	3211	3323	3446	3582	3737

-NASTAVAK	7	8	9	10	UKUPNO	PROSEK
A. UKUPNI PRIHOD	12768	12768	12768	12768	127680	12768
B. UKUPNI RASHODI	8447	8261	6298	6298	83236	8324
1. POSLOV. RASHODI	8057	8057	6298	6298	77082	7708
-Mater. troškovi	2620	2620	2620	2620	26200	2620
-Energija	182	182	182	182	1815	182
-Održavanje	1270	1270	375	375	10914	1091
-Osiguranje	269	269	150	150	2458	246
-Amortizacija	1496	1496	751	751	13495	1350
-Usl. i ost. mat.	1000	1000	1000	1000	10000	1000
-Nemater. trošk.	800	800	800	800	8000	800
-Licni dohoci	420	420	420	420	4200	420
2. RASHODI FINANS.	390	204			6154	615
-Kamata	390	204			6154	615
C. BRUTO DOBIT	4321	4507	6470	6470	44444	4444
-Porezi i dop.	432	451	647	647	4444	444
E. NETO DOBIT	3889	4056	5823	5823	39999	4000

5. EKONOMSKI NOVČANI TOK

Tabela 5. *Ekonomski novčani tok*

u 000 \$

GODINE	1	2	3	4	5	6
I. NOVČANI PRILIVI						
1. Ukupni prihod	12768	12768	12768	12768	12768	12768
-Realizacija	12768	12768	12768	12768	12768	12768
-Ostali prihodi						
2. Ostatak vred.						
-Osnovna sreds.						
-Obrtna sreds.						
UKUPNI PRILIV	12768	12768	12768	12768	12768	12768
II. NOVČANI ODLIVI						
4. Investicije	16695					
6. Troškovi posl.	6142	6142	6142	6142	6142	6141
7. Licni dohoci	420	420	420	420	420	420
8. Zakonske obav.	345	357	369	383	398	415
UKUPNI ODLIV	23603	6919	6931	6945	6960	6976
NETO EKONOM. TOK	-10835	5849	5837	5823	5808	5792
Kumulativ	-10835	-4986	851	6674	12481	18274
DISKONTOVANA VRED:						
-Sa 8.00 %	-10835	5416	5004	4622	4269	3942
-Sa 10.00 %	-10835	5317	4824	4375	3967	3597
-Sa 12.00 %	-10835	5222	4653	4145	3691	3287
-Sa 53.17 % (ISR)	-10835	3819	2488	1620	1055	687

-NASTAVAK	7	8	9	10	UKUPNO	PROSEK
I. NOVCANI PRILIVI						
1. Ukupni prihod	12768	12768	12768	12768	127680	12768
-Realizacija	12768	12768	12768	12768	127680	12768
-Ostali prihodi						
2. Ostatak vred.						
-Osnovna sreds.						
-Obrtna sreds.				3200		
UKUPNI PRILIV	12768	12768	12768	15968	130880	13088
II. NOVCANI ODLIVI						
4. Investicije					16695	1670
6. Troškovi posl.	6141	6141	5127	5127	59387	5939
7. Licni dohoci	420	420	420	420	4200	420
8. Zakonske obav.	432	451	647	647	4444	444
UKUPNI ODLIV	6993	7011	6194	6194	84726	8473
NETO EKONOM. TOK	5775	5757	6574	9774	46154	4615
Kumulativ	24049	29806	36380	46154		
DISKONTOVANA VRED:						
-Sa 8.00 %	3639	3359	3552	4889	27858	2786
-Sa 10.00 %	3260	2954	3067	4145	24670	2467
-Sa 12.00 %	2926	2604	2655	3525	21872	2187
-Sa 53.17 % (ISR)	447	291	217	211	0	

6. FINANSIJSKI NOVČANI TOK

Tabela 6. *Finansijski novčani tok*

u 000 \$

GODINE	1	2	3	4	5	6
I. NOVCANI PRILIVI						
1. Ukupni prihod	12768	12768	12768	12768	12768	12768
-Realizacija	12768	12768	12768	12768	12768	12768
-Ostali prihodi						
2. Sopstvena sr.						
3. Krediti	12500					
4. Ostatak vred.						
-Osnovna sreds.						
-Obrtna sreds.						
UKUPNI PRILIV	29463	12768	12768	12768	12768	12768
II. NOVCANI ODLIVI						
5. Investicije	16695					
7. Mater.rashodi	6142	6142	6142	6142	6142	6141
8. Licni dohoci	420	420	420	420	420	420
9. Zakonske obav.	345	357	369	383	398	415
10. Rashodi finan.	1250	1137	1012	876	725	559
11. Otplate	1131	1244	1369	1506	1656	1690
UKUPNI ODLIV	25984	9300	9313	9326	9341	9225
NETO FINANS. TOK	3479	3468	3455	3442	3427	3543
Kumulativ	3479	6947	10402	13844	17270	20813
DISKONTOVANA VRED:						
-Sa 8.00 %	3479	3211	2962	2732	2519	2411
-Sa 10.00 %	3479	3152	2856	2586	2340	2200
-Sa 12.00 %	3479	3096	2755	2450	2178	2010

-NASTAVAK	7	8	9	10	UKUPNO	PROSEK
I. NOVCANI PRILIVI						
1. Ukupni prihod	12768	12768	12768	12768	127680	12768
2. Sopstvena sr.					4195	420
3. Krediti					12500	1250
4. Ostatak vred.						
-Osnovna sreds.						
-Obrtna sreds.				3200		
UKUPNI PRILIV	12768	12768	12768	15968	147575	14758
II. NOVCANI ODLIVI						
5. Investicije					16695	1670
7. Mater.rashodi	6141	6141	5127	5127	59387	5939
8. Licni dohoci	420	420	420	420	4200	420
9. Zakonske obav.	432	451	647	647	4444	444
10. Rashodi finan.	390	204			6154	615
11. Otplate	1859	2045			12500	1250
UKUPNI ODLIV	9242	9261	6194	6194	103381	10338
NETO FINANS. TOK	3526	3507	6574	9774	44194	4419
Kumulativ	24339	27847	34421	44194		
DISKONTOVANA VRED:						
-Sa 8.00 %	2222	2047	3552	4889	30024	3002
-Sa 10.00 %	1990	1800	3067	4145	27615	2762
-Sa 12.00 %	1786	1587	2655	3525	25520	2552

Projekat je likvidan tokom celog perioda.

7. DINAMIČKA OCENA

Ova ocena je vrlo pozitivna po svim metodama:

- Intrena stopa prinosa iznosi 53,17%
- Period povratka ulaganja je 2 godine
- Neto sadašnja vrednost projekta sa 10% iznosi: 24.670.000 USD

8. STATIČKI POKAZATELJI U 5. GODINI VEKA PROJEKTA

1. Koeficijent ekonomičnosti:

Ukupan prihod/ukupni troškovi
= 12.768.000/8.788.000=1,45

2. Stopa akumulativnosti:

Dobit/ukupna ulaganja
= 3.980.000/16.695.000=23,8%

3. Prosta stopa prinosa:

Neto dobit/ukupna ulaganja
= 3.582.000/16.695.000=21,46%

4. Reproductivnost:

Neto dobit + Amortizacija/ Ukupne investicije
= 5.083.000/16.695.000= 30,44%

5. **Stopa dobiti:** dobit/ realizacija
= 3.980.000/12.768.000=31%

9. STATIČKA ANALIZA OSETLJIVOSTI

1) Određivanje prelomne tačke rentabiliteta tj. kritičnog kapaciteta:

Minimalno iskorišćen stepen kapaciteta određuje prelomnu tačku u korišćenju proizvodnih kapaciteta tj. određuje najniži nivo njihovog korišćenja na kojoj se projekat još uvek nalazi iznad zone gubitka.

$$BREK\ EVEN\ POINT\ (BEP) = \frac{Uk.\ fiksni\ troškovi}{Uk.\ prihod - Uk.\ varijabilni\ troškovi} \cdot 100 =$$

$$= \frac{5.704.000}{12.768.000 - 2.620.000} = 56,2\%, \text{ tj. } 1708\ t\ ukupnog\ katodnog\ Cu$$

Na toj tački su prihodi jednaki troškovima i nema dobiti. Iznad te tačke je dobit, a ispod gubitak.

10. DINAMIČKA ANALIZA OSETLJIVOSTI

TABELA OSETLJIVOSTI

Tabela 10. Tabela osetljivosti sa zadatim promenama

%Promene	-60%	-50%	-40%	-30%	-20%	-10%	0%	+10%	+20%	+30%	+40%	+50%	+60%
PRIHOD:													
-E :	0	0	0	12	24	38	53	72	95	> 100			
-F :	0	0	0	5	16	27	40	55	73	96	0	0	0
-D :	0	0	0	12	26	41	59	81	0	0	0	0	0
TROSKOVI:													
-E :	0	0	99	85	73	63	53	45	37	30	23	17	11
-F :	0	88	76	65	56	48	40	33	27	21	15	10	4
-D :	0	0	0	98	83	70	59	49	40	32	24	17	11
INVESTICIJE:													
-E :	>100			78	63	53	46	40	35	31	24	20	
-F :	0	0	90	69	56	47	40	35	31	27	24	21	19
-D :	0	0	0	0	87	70	59	50	44	39	34	31	28
PLATE:													
-E :	57	56	55	55	54	54	53	53	52	52	51	50	50
-F :	43	42	42	41	41	40	40	40	39	39	38	38	37
-D :	63	62	61	61	60	59	59	58	57	57	56	56	55
ZAKONSKE:													
-E :	56	56	55	55	54	54	53	53	52	52	51	50	50
-F :	43	42	42	41	41	40	40	40	39	39	38	38	37
-D :	59	59	59	59	59	59	59	59	59	59	59	59	59
Legenda: E = Ekonomska interna stopa rentabiliteta.													
F = Finansijska interna stopa rentabiliteta.													
D = Društvena interna stopa rentabiliteta.													

Iz prezentirane tabele sledi da je projekat najosetljiviji na promenu prihoda. Pad prihoda od 30 % dovodi do pada ISR na 12% što je jednako ceni pozajmljenih sredstava.

Analizom osetljivosti **povećanjem vrednosti ulaganja** soferom „REMIP- računarsko ekonomski model investicionog planiranja “* dolazi se do sledećeg:

+60%

ISR-19,7%

NSV(12%) -6.633.000 USD

Period povratka ulaganja-5 godina

+50%

ISR-23,77%

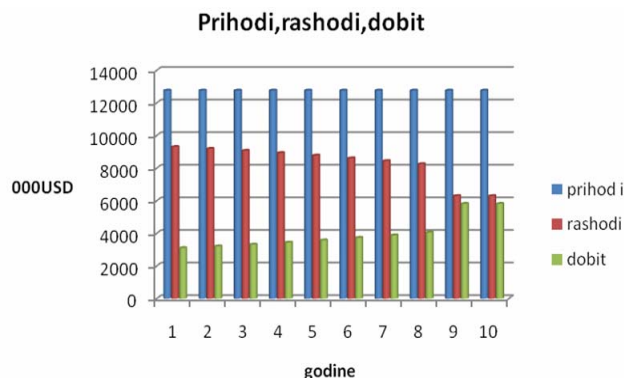
NSV(12%)-9.490.000 USD

Period povratka ulaganja-4 godine

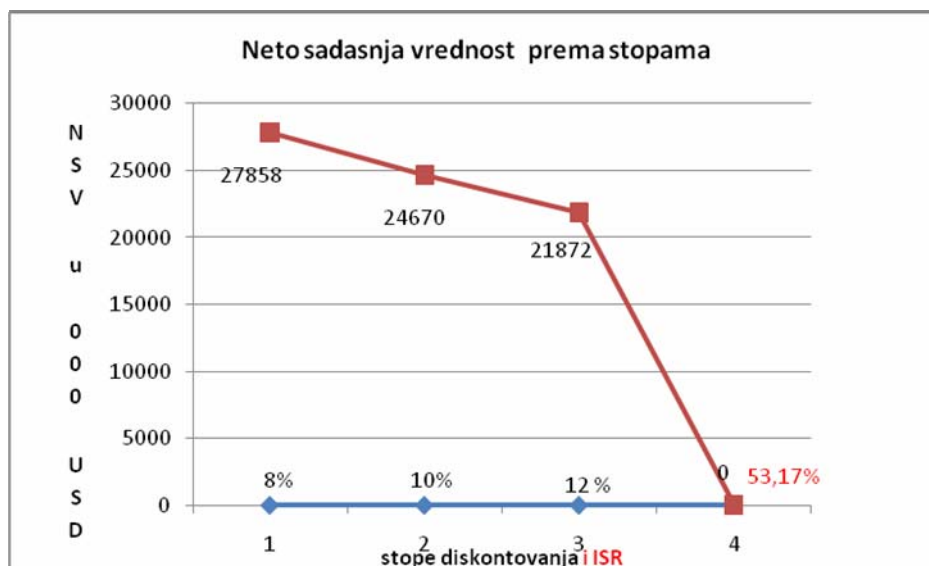
11. ZBIRNA OCENA

OPIS	vrednost	j.m.
1. VEK PROJEKTA	10	God.
2. UKUPNE INVESTICIJE :	16.695.000	
OSNOVNA SREDSTVA	13.495.000	USD
OBRTNA SREDSTVA	3.200.000	
3. PRIHOD		
- Ukupan prihod	127.680.000	USD
- Prosečni godišnji prihod	12.768.000	USD
4. RASHOD		
- Ukupni troškovi	83.236.000	USD
- Pros. godišnji troškovi	8.324.000	USD
5. DOBIT		
-Ukupna bruto dobit	44.444.000	USD
-Prosečna god. bruto dobit	4.444.000	USD
-Ukupna neto dobit	39.999.000	USD
-Prosečna god.neto dobit	4.000.000	USD
6. Prosečna Cena koštanja po t katode	2884,2	USD
7. Ukupna stopa dobiti	34,8	%
8. BEP	56,2	%
9. POKAZATELJI USPEŠNOSTI:		
ISR - Interna stopa rentabilnosti	53,7	%
PP - Period povraćaja sredstava.	2	GOD.
NSV - Neto sadašnja vrednost (10%)	24.670.000	USD

Na osnovu tehničko-tehnoloških **visoko pozitivne rezultate.** rešenja ekonomska analiza je pokazala



Grafik 1. Grafik prihoda, rashoda i dobiti



Grafik 2. Grafik neto sadašnje vrednosti prema stopama diskontovanja

ZAKLJUČAK

Ekonomska analiza i mogućnost povratka investicija zasnovana je na podacima tehnoloških mogućnosti proizvodnje godišnje količine 3040 t katodnog bakra. Zbirna ocena ekonomske analize pokazuje sledeće:

VEK PROJEKTA: 10 godina, INVESTICIJE U OSNOVNA SREDSTVA 13.495.000 USD, PRIHOD: Ukupan prihod 127.680.000 USD, Prosečni godišnji prihod 12.768.000 USD, RASHOD: Ukupni troškovi 83.236.000 USD, Prosečni godišnji troškovi 8.324.000 USD; DOBIT:

Ukupna bruto dobit 44.444.000 USD, Prosečna godišnja bruto dobit 4.444.000 USD, Ukupna neto dobit 39.999.000 USD, Prosečna neto dobit 4.000.000 USD; Prosečna cena koštanja po t katode 2884,2 USD, Ukupna stopa dobiti 34,8%, BEP 56,2%; POKAZATELJI USPEŠNOSTI: Interna stopa rentabilnosti 53,7%, Period povraćaja sredstava 2 godine, Neto sadašnja vrednost (10%) 24.670.000 USD. Navedeni podaci pokazuju da, na osnovu datih tehničkih elemenata, polazna sagledavanja pokazuju visoko pozitivne rezultate.

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Gordana Slavković, Mile Bugarin*, Radojka Jonović**

ECONOMIC PROJECTIONS OF COPPER VALORIZATION FROM THE OSTRELJ WASTE DUMPS AND THE OLD FLOTATION TAILING DUMP**

Abstract

The economic projections are based on the expert insight of the annual copper valorization from the Ostrelj waste dumps and the Old Flotation tailing dump for the next ten years to the aim of approximate consideration the cost-effectiveness of production the total capacity of about 3040 t of cathode copper, based on a complex technical and technological investigations. Preliminary economic considerations have showed highly positive results of the success and profitability through the balance of success, economic cash flow, cost price and so on.

Key words: *copper valorization, result, success, cost effectiveness*

1. INTRODUCTION

Based on the defined technical-technological parametars for copper valorization from the Ostrelj waste dumps and the Old Flotation tailing dump, the estimated and defined total investments for the fixed assets are USD 13.495.000.

- Total loan is 12.500.000 USD
- Repayment period 8 years, the interest rate is 10%, equal to the annual instalments.

Table 1. *Total investments and financial construction*In 000 \$

I. Total fixed assets	13495	13495
Current assets	3200	3200
Total investments	16695	16695
II. SOURCES		
1. Self funds	4195	4195
2. Loans	12500	12500
Total sources	16695	16695

* *Mining and Metallurgy Institute Bor*

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Table 1.1. Plan of loan repaymentIn 000 \$

Name of loan : loan 1		USD:		500.00	
TERMS: 5 YEARS		RATE: 10.000%			
Year	repayment	rate	nstilment	loan	
1	132	50	82	500	
2	132	42	90	418	
3	132	33	99	328	
4	132	23	109	229	
5	132	12	120	120	
Total:	660	160	500		
Pros:	132	32	100		
Name of loan: Loan 2		USD:		12000.00	
Terms: 8 years		RATE.: 10.000%			
1	2249	1200	1049	12000	
2	2249	1095	1154	10951	
3	2249	980	1270	9796	
4	2249	853	1397	8527	
5	2249	713	1536	7130	
6	2249	559	1690	5594	
7	2249	390	1859	3904	
8	2249	204	2045	2045	
Total:	17992	5994	12000		
Pros:	2249	749	1500		
Total	18652	6154	12500		

2. CALCULATION OF REVENUE

Revenue was calculated on the basis of copper cathode quantity and selling prices.

Table 2. Calculation of revenueIn 000 \$

PRODUCT		PRICE	REVENUE	REVENUE
* year :	1-10			
1 Cu	1500.0000	4.2000	6,300.00	6,300.00
1 Cu	1540.0000	4.2000	6,468.00	6,468.00
** Annual revenue			12,768.00	12,768.00
* Total revenue			127,680.00	127,680.00

3. PRODUCT PRICE

1) Total product price of 3040 t copper cathode per year

Table 3. Total product price..... In 000 \$

Years	1	2	3	4	5	6
1. Raw & material .	2620	2620	2620	2620	2620	2620
2. Energy	182	182	182	182	182	182
3. Maintenance	1271	1271	1271	1271	1271	1270
4. Amortization	1501	1501	1501	1501	1501	1496
5. Other mat.costs	1000	1000	1000	1000	1000	1000
6. Non-mater.costs	800	800	800	800	800	800
7. Salaries	420	420	420	420	420	420
8. Interests	1250	1137	1012	876	725	559
9. Insurance	270	270	270	270	270	269
I. TOTAL	9313	9200	9076	8939	8788	8616
10. Taxes	345	357	369	383	398	415

Years	7	8	9	10	TOTAL	AVERAGE
1. Raw & material	2620	2620	2620	2620	26200	2620
2. Energy	182	182	182	182	1815	182
3. Maintenance	1270	1270	375	375	10914	1091
4. Amortization	1496	1496	751	751	13495	1350
5. Other mat.costs	1000	1000	1000	1000	10000	1000
6. Non-mater.costs	800	800	800	800	8000	800
7. Salaries	420	420	420	420	4200	420
8. Interests	390	204			6154	615
9. Insurance	269	269	150	150	2458	246
I. TOTAL	8447	8261	6298	6298	83236	8324
10. Taxes	432	451	647	647	4444	444
II. Full product price	8879	8712	6945	6945	87681	8768

Average product price is 2884.2 USD/t cathode.

4 PROFIT & LOSS ACCOUNT

Table 4. Profit & Loss Account..... In 000 \$

Years	1	2	3	4	5	6
A. Revenue	12768	12768	12768	12768	12768	12768
B. Costs	9313	9200	9076	8939	8788	8616
1. Operating costs	8063	8063	8063	8063	8063	8057
-Raw & material	2620	2620	2620	2620	2620	2620
-Energy	182	182	182	182	182	182
-Maintenance	1271	1271	1271	1271	1271	1270
-Insurance	270	270	270	270	270	269
-Amortization	1501	1501	1501	1501	1501	1496
-Serv. other mat.	1000	1000	1000	1000	1000	1000
-Non-mater.costs	800	800	800	800	800	800
-Salaries	420	420	420	420	420	420
2. Financial costs	1250	1137	1012	876	725	559
-Interests	1250	1137	1012	876	725	559
C. Gross profit	3455	3568	3692	3829	3980	4152
-Taxes	345	357	369	383	398	415
E. Net profit	3109	3211	3323	3446	3582	3737

-continuation	7	8	9	10	total	average
A. Revenue	12768	12768	12768	12768	127680	12768
B. Costs	8447	8261	6298	6298	83236	8324
1. Operating costs	8057	8057	6298	6298	77082	7708
- Raw & material	2620	2620	2620	2620	26200	2620
- Energy	182	182	182	182	1815	182
- Maintenance	1270	1270	375	375	10914	1091
- Insurance	269	269	150	150	2458	246
- Amortization	1496	1496	751	751	13495	1350
- Serv.other mat.	1000	1000	1000	1000	10000	1000
- Non-mater.costs	800	800	800	800	8000	800
- Salaries	420	420	420	420	4200	420
2. Financial costs	390	204			6154	615
- Interests	390	204			6154	615
C. Gross profit	4321	4507	6470	6470	44444	4444
- Taxes	432	451	647	647	4444	444
E. Net profit	3889	4056	5823	5823	39999	4000

5. ECONOMIC CASH FLOW

Table 5. Economic Cash FlowIn 000 \$

Years	1	2	3	4	5	6
I. CASH INFLOW						
1. CASH FROM SALES	12768	12768	12768	12768	12768	12768
2. Residual						
- Fixed assets						
- Current assets						
TOTAL	12768	12768	12768	12768	12768	12768
II. CASH OUTFLOWS						
4. Investments	16695					
6. Operational costs	6142	6142	6142	6142	6142	6141
7. Salaries	420	420	420	420	420	420
8. Taxes	345	357	369	383	398	415
TOTAL	23603	6919	6931	6945	6960	6976
Net cash flow	-10835	5849	5837	5823	5808	5792
Cumulative	-10835	-4986	851	6674	12481	18274
DISCOUNTED VALUE						
- 8.00 %	-10835	5416	5004	4622	4269	3942
-10.00 %	-10835	5317	4824	4375	3967	3597
-12.00 %	-10835	5222	4653	4145	3691	3287
-53.17 % (IRR)	-10835	3819	2488	1620	1055	687

-continuation	7	8	9	10	TOTAL	AVERAGE
I. CASH INFLOW						
1. CASH FROM SALES	12768	12768	12768	12768	127680	12768
2. Residual						
- Fixed assets						
- Current assets				3200		
TOTAL	12768	12768	12768	15968	130880	13088
II. CASH OUTFLOWS						
4. Investments					16695	1670
6. Operational costs	6141	6141	5127	5127	59387	5939
7. Salaries	420	420	420	420	4200	420
8. Taxes	432	451	647	647	4444	444
TOTAL	6993	7011	6194	6194	84726	8473
Net cash flow	5775	5757	6574	9774	46154	4615
Cumulative	24049	29806	36380	46154		
DISCOUNTED VALUE						
-8.00 %	3639	3359	3552	4889	27858	2786
-10.00 %	3260	2954	3067	4145	24670	2467
-12.00 %	2926	2604	2655	3525	21872	2187
-53.17 % (IRR)	447	291	217	211	0	

6. FINANCIAL CASH FLOW

Table 6. Financial Cash Flow.....In 000 \$

Years	1	2	3	4	5	6
I. CASH INFLOW						
1. CASH FROM SALES	12768	12768	12768	12768	12768	12768
2. Self funds	4195					
3. Loans	12500					
4. Residual						
- Fixed assets						
- Current assets				.		
TOTAL	29463	12768	12768	12768	12768	12768
II. CASH OUTFLOWS						
5. Investments	16695					
7. Operational costs	6142	6142	6142	6142	6142	6141
8. Salaries	420	420	420	420	420	420
9. Taxes	345	357	369	383	398	415
10. Interests	1250	1137	1012	876	725	559
11. Repayments	1131	1244	1369	1506	1656	1690
Total	25984	9300	9313	9326	9341	9225
Net cash flow	3479	3468	3455	3442	3427	3543
Cumulative	3479	6947	10402	13844	17270	20813
DISCOUNTED VALUE						
- 8.00 %	3479	3211	2962	2732	2519	2411
- 10.00 %	3479	3152	2856	2586	2340	2200
- 12.00 %	3479	3096	2755	2450	2178	2010

-continuation	7	8	9	10	total	average
I. CASH INFLOW						
1. CASH FROM SALES	12768	12768	12768	12768	127680	12768
2. Self funds					4195	420
3. Loans					12500	1250
4. Residual						
- Fixed assets						
- Current assets				3200		
TOTAL	12768	12768	12768	15968	147575	14758
II. CASH OUTFLOWS						
5. Investments					16695	1670
7. Operational costs	6141	6141	5127	5127	59387	5939
8. Salaries	420	420	420	420	4200	420
9. Taxes	432	451	647	647	4444	444
10. Interests	390	204			6154	615
11. Repayments	1859	2045			12500	1250
TOTAL	9242	9261	6194	6194	103381	10338
NETO FINANS. TOK	3526	3507	6574	9774	44194	4419
Cumulative	24339	27847	34421	44194		
DISCOUNTED VALUE						
- 8.00 %	2222	2047	3552	4889	30024	3002
-10.00 %	1990	1800	3067	4145	27615	2762
-12.00 %	1786	1587	2655	3525	25520	2552

The Project is liquid throughout the period.

7. DYNAMIC EVALUATION

Dynamic evaluation is very positive by all methods:

- Internal rate of return is 53.17%
- Payback period is 2 years
- Net present value (10%) is:
24.670.000 USD

8. STATIC EVALUATION IN THE 5. YEAR OF THE PROJECT

1. Coefficient in the economics:

$$\text{Revenue/total costs} = 12.768.000/8.788.000=1.45$$

2. Rate of accumulation:

$$\text{Gross profit/total investments} = 3.980.000/16.695.000=23.8\%$$

3. Simple rate of return:

Net profit/total investments
= 3.582.000/16.695.000=21.46%

4. Reproduction:

Net profit+Amortization/ total investments
=5.083.000/16.695.000= 30.44%

5. Rate of profit:

Gross profit /revenue
=3.980.000/12.768.000=31%

9. STATIC SENSITIVITY ANALYSIS

$$\text{BREAK EVEN POINT(BEP)} = \frac{\text{Total fixed costs}}{\text{Total revenue} - \text{Total variable costs}} \cdot 100 =$$

$$= \frac{5.704.000}{12.768.000 - 2.620.000} = 56.2\% \text{ 1708t Total Cu cathode}$$

At that point, the revenues are equivalent to the costs. The profit is above that point, and the loss is below it.

10. DYNAMIC SENSITIVITY ANALYSIS

TABLE OF SENSITIVITY

Table 10. Table of sensitivity with changes

%changes	-60%	-50%	-40%	-30%	-20%	-10%	0%	+10%	+20%	+30%	+40%	+50%	+60%
REVENUE													
-E :	0	0	0	12	24	38	53	72	95	> 100			
-F :	0	0	0	5	16	27	40	55	73	96	0	0	0
-D :	0	0	0	12	26	41	59	81	0	0	0	0	0
COSTS													
-E :	0	0	99	85	73	63	53	45	37	30	23	17	11
-F :	0	88	76	65	56	48	40	33	27	21	15	10	4
-D :	0	0	0	98	83	70	59	49	40	32	24	17	11
INVESTMENTS													
-E :			>100	78	63	53	46	40	35	31	24	20	
-F :	0	0	90	69	56	47	40	35	31	27	24	21	19
-D :	0	0	0	0	87	70	59	50	44	39	34	31	28
SALARIES													
-E :	57	56	55	55	54	54	53	53	52	52	51	50	50
-F :	43	42	42	41	41	40	40	40	39	39	38	38	37
-D :	63	62	61	61	60	59	59	58	57	57	56	56	55
TAXES													
-E :	56	56	55	55	54	54	53	53	52	52	51	50	50
-F :	43	42	42	41	41	40	40	40	39	39	38	38	37
-D :	59	59	59	59	59	59	59	59	59	59	59	59	59
Legend: E = Economic IRR													
F = Financial IRR													
S = Social IRR													

From the present Table, it follows that the Project is the most sensitive on the revenue change. If the revenue falls 30%, IRR will be 12% and that is equivalent to the interest rate.

Sensitivity analysis with an increase of investments, using the software "RE-MIP", the computer - economic model of investments planning results into the following:

+60%

IRR – 19.7 %

NPV (12%) - 6.633.000 USD

Payback period - 5 years

+50%

IRR - 23/77 %

NPV (12%) - 9.490.000 USD

Payback period - 4 years

11. TOTAL EVALUATION

DESCRIPTION	VALUE	U.M.
1. Period of the Project	10	Year
2.Total investments:	16.695.000	
Fixed assets	13.495.000	USD
Current assets	3.200.000	
3. REVENUE		
- Total revenue	127.680.000	USD
- Average revenue	12.768.000	USD
4. COSTS		
- Total costs	83.236.000	USD
- Average costs	8.324.000	USD
5. Profit		
-Total gross profit	44.444.000	USD
-Average gross profit	4.444.000	USD
-Total net profit	39.999.000	USD
-Average net profit	4.000.000	USD
6. Average product cathode price per tone	2884.2	USD
7. Total rate of profit	34,8	%
8.BEP	56.2	%
9.PAYABLE OF INVESTMENTS:		
IRR - Internal rate of return	53.7	%
PP - Payback period	2	Year
NPV – Net present value (10%)	24.670.000	USD

Based on the technical-technological parameters, the economic analysis has shown high positive results.

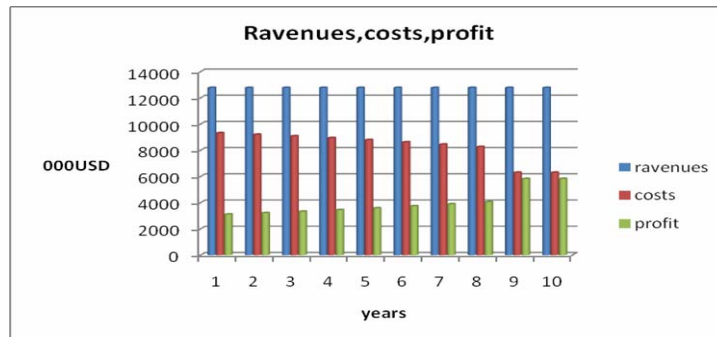


Figure 1. Graph of the revenue, costs and profit

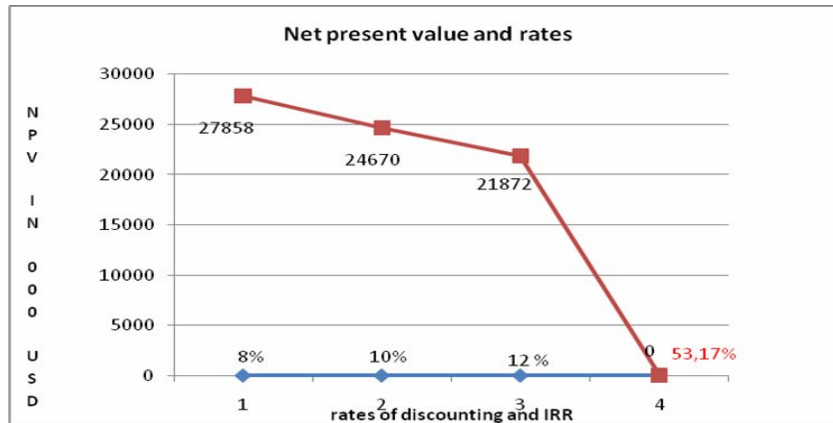


Figure 2. Graph of the net present value according to the discount rates

CONCLUSION

Economic analysis and possibility of investment return is based on data for the technical possibility of production the annual amount of 3040 t of cathode copper. Cumulative evaluation of economic analysis shows the following: PERIOD OF PROJECT: 10 years, INVESTMENTS IN FIXED ASSETS 13.495.000 USD, REVENUE: Total revenue 127.680.000 USD, Average revenue 12.768.000 USD, COSTS: Total costs 83.236.000 USD, Average costs 8.324.000 USD, PROFIT: Total gross profit 44.444.000 USD, Average gross profit 4.444.000 USD, Total net profit 39.999.000 USD, Average net profit 4.000.000 USD; Average product price 2884.2 USD per ton of copper cathode, Total rate of profit 34,8%, Break even point 56.2%; PAYABLE OF INVESTMENTS: Internal rate of return 53.7%, Payback period 2 years, Net present value (10%) 24.670.000 USD. The specified data have shown, according to the technical elements, that the initial considerations have shown high positive results.

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