



**SPECIFIC ECONOMIC AND TECHNICAL
INFORMATION (DATABASE) FOR BENCHMARKING
IN ERRA MEMBERS**

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CONTENTS

I INTRODUCTION

II DATABASE (DATA TEMPLATES)

III DATA COLLECTION

IV DATA VALIDATION

V PRESENTATION ON FINDINGS

**VI SUGGESTED ACTIVITIES IN THE FUTURE AND
THEIR TIMING**

I INTRODUCTION

- **The basic idea: Create the database with specific economic and technical information that should enable ERRA members to have an insight and access into economic and technical data that can help the regulatory body's examine the justification of price proposals in electricity distribution sector.**
- **The users of database: All ERRA members (regardless of the fact if the methods of incentive regulation (X-factor) are applied or not in their countries).**
- **Caveat: Benchmarking is rather a useful tool than a direct method used by regulatory bodies!**

II DATABASE (DATA TEMPLATES)

- **What to collect: Identification of necessary economic and technical data.**
- **How to collect: Simple template for data collection.**
- **Tariff / Pricing Committee had defined the form and content of data template and after that focused on data collection.**

III DATA COLLECTION

- **In any benchmarking analyses the benchmark sample and data quality are extremely important.**
- **Completed data templates have been submitted by 13 ERRA members (for 26 electricity distribution companies) and that enable us to make more complex and advanced benchmarking analyses such as OLS, COLS, DEA, SFA and so on.**
- **Applied benchmarking analysis: 1) Uni - dimensional measures of performance (performance indicators as the simplest measures of performance that can be compared), 2) OLS & COLS, and 3) DEA.**

IV/1 DATA VALIDATION

- **Data validation is significantly relevant aspect for benchmarking analyses. The quality of the data to be used in the benchmarking analyses will be reflected in the benchmark results.**
- **Prior to making benchmarking analysis, data control has been carried out, i.e. some simple cross checks and data adjustment have been done.**

IV/2a DATA VALIDATION

DATA VALIDATION - ADJUSTED DATA (Data for 2007)

O/N	Country	Country Codes	Ownership Status ^{x)}	Method of Regulation ^{y)}	Served Area (sq. km)	Total length of Lines (km)	Total Electricity Distributed (MWh)	Total number of consumers connected	Employees	O&M Costs (000 US\$)
1	Armenia	Arm1	0	0	30.000	29.622	4.621.500	936.322	7.759	64.035
2	Serbia 1	Ser1	1	0	25.211	57.542	6.270.060	869.189	2.705	136.622
3	Serbia 2	Ser2	1	0	21.500	24.785	7.691.919	894.637	2.208	128.320
4	Serbia 3	Ser3	1	0	2.838	14.175	6.441.390	753.453	1.511	105.055
5	Lithuania 1	Lit1	0&1	1	34.800	62.861	4.114.113	766.947	2.021	116.907
6	Lithuania 2	Lit2	0	1	30.378	57.509	3.938.000	710.825	1.631	72.161
7	Latvia	Lat1	1	0	64.600	100.323	6.728.300	1.094.784	3.293	239.731
8	Macedonia	Mac1	0	1	25.456	22.388	4.723.000	760.390	3.720	106.934
9	Unmik Kosovo	UnK1	1	1	0	0	3.950.900	360.098	857	38.644
10	Kyrgyzstan 1	Kyr1	0	0	0	13.324	1.560.225	173.145	1.705	7.833
11	Kyrgyzstan 2	Kyr2	0	0	0	13.563	1.427.600	329.189	0	43.668

IV/2b DATA VALIDATION

DATA VALIDATION - ADJUSTED DATA (Data for 2007)

O/N	Country	Country Codes	Ownership Status x)	Method of Regulation y)	Served Area (sq. km)	Total length of Lines (km)	Total Electricity Distributed (MWh)	Total number of consumers connected	Employees	O&M Costs (000 US\$)
12	Bulgaria 1	Bul1	0&1	1	39.924	60.020	9.964.783	1.967.332	3.105	179.435
13	Bulgaria 2	Bul2	0&1	1	42.745	64.117	8.647.000	1.591.836	3.296	145.270
14	Bulgaria 3	Bul3	0&1	1	29.617	40.867	5.166.162	1.162.641	1.693	122.241
15	Bulgaria 4	Bul4	0	1	0	0	82.000	665	54	1.227
16	Hungary 1	Hun1	0	1	18.235	31.487	4.004.467	755.924	910	86.669
17	Hungary 2	Hun2	0	1	4.134	22.987	9.942.926	1.409.701	1.828	204.452
18	Hungary 3	Hun3	0	1	15.509	22.598	5.731.811	720.469	1.048	110.945
19	Hungary 4	Hun4	0	1	18.472	25.090	3.993.874	736.971	1.132	105.385
20	Hungary 5	Hun5	0	1	18.223	30.435	7.515.127	970.157	1.283	141.521
21	Hungary 6	Hun6	0	1	18.728	25.418	4.011.947	758.644	1.118	122.980
22	Albania	Alb1	1	0	28.000	42.768	6.223.000	990.831	6.700	179.132

x) O - Private, 1 - State owned; y) 0 - Cost based, 1 - Incentive

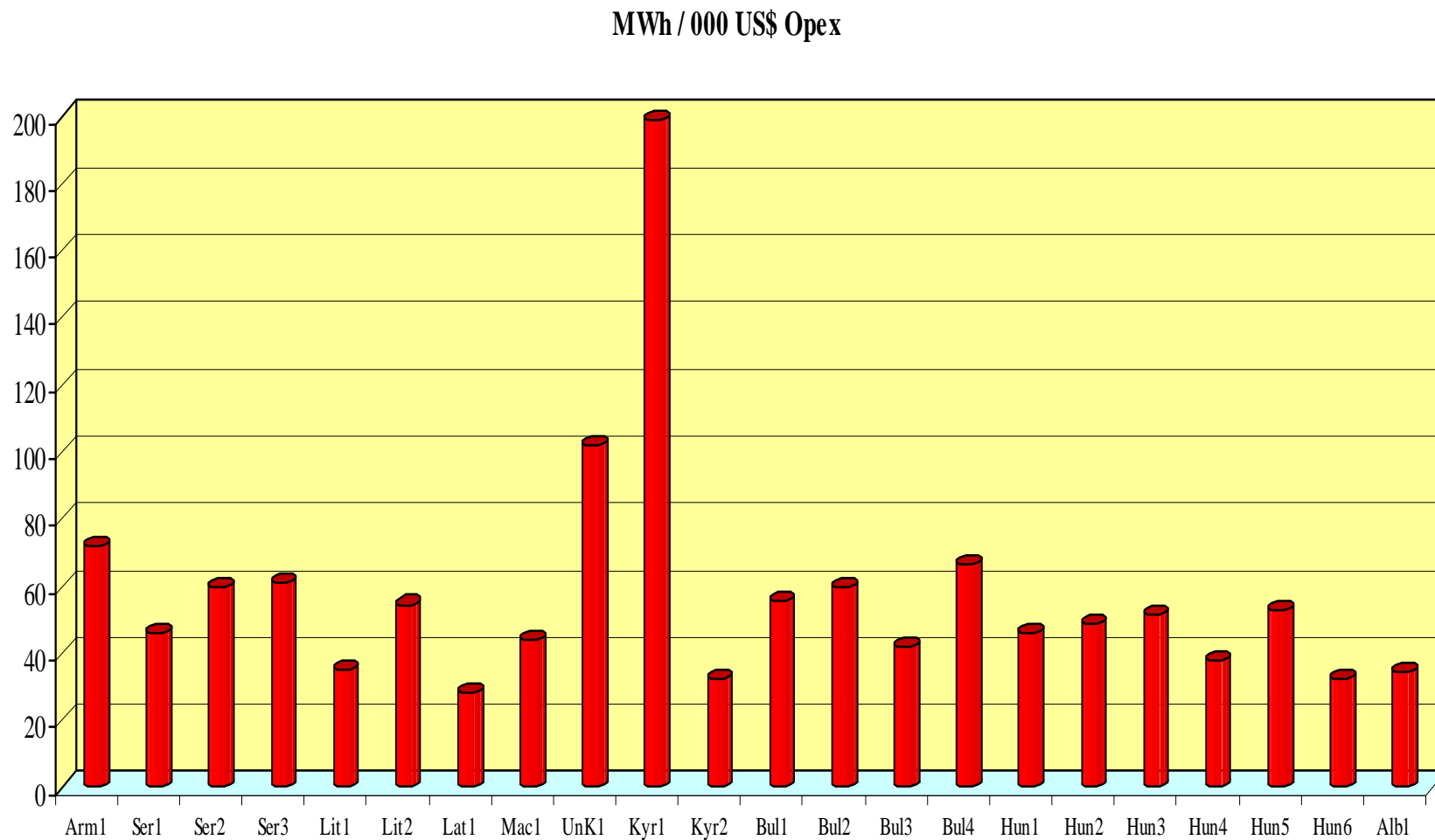
Uncompleted and/or unreliable data: Turkey, Estonia, Georgia and Kyrgyzstan 3 (without Opex data)

Weighted factor: 40% MWh/Opex, 40% Customers/Opex, 5% Length/Opex, 5% Area/Opex, 5% Employees/Opex and 5% Customers/Employee

Notes: Opex data are given without PPP (Purchasing Power Parity) adjustment (uncompleted and/or unreliable PPP data)!!!

V/1a PRESENTATION ON FINDINGS

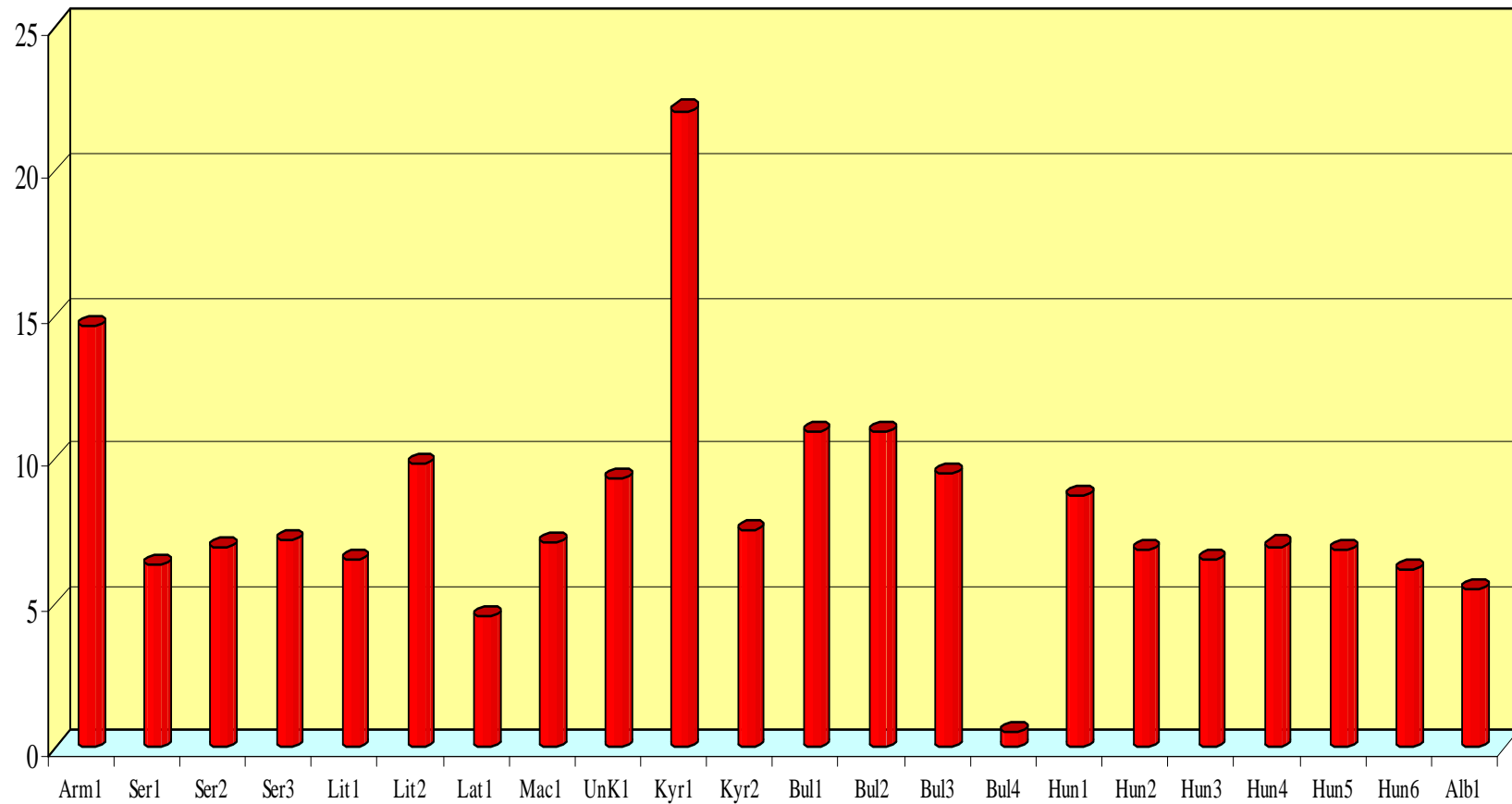
Uni – dimensional indicators



V/1b PRESENTATION ON FINDINGS

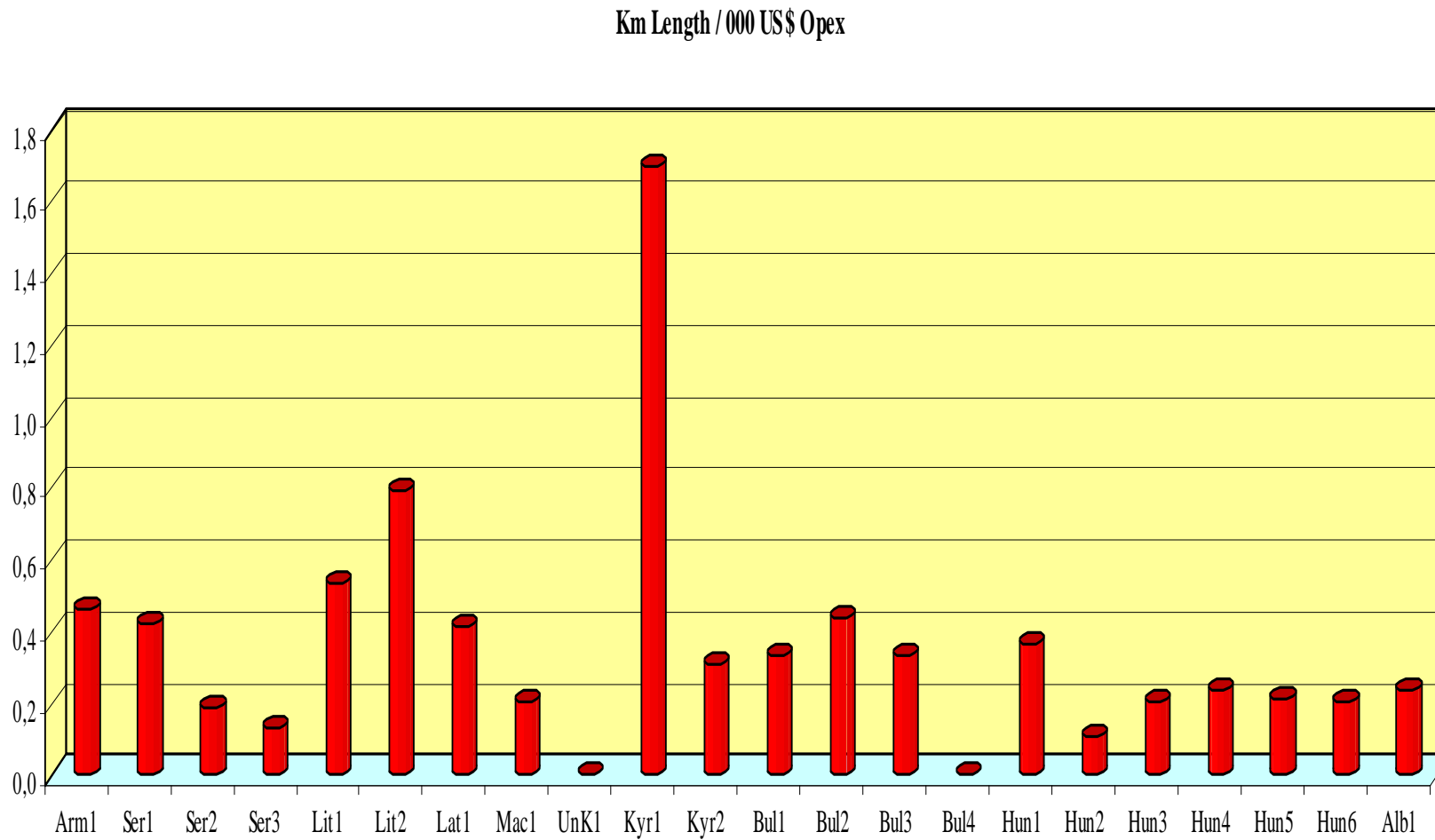
Uni – dimensional indicators

Customers / 000 US\$ Opex



V/1c PRESENTATION ON FINDINGS

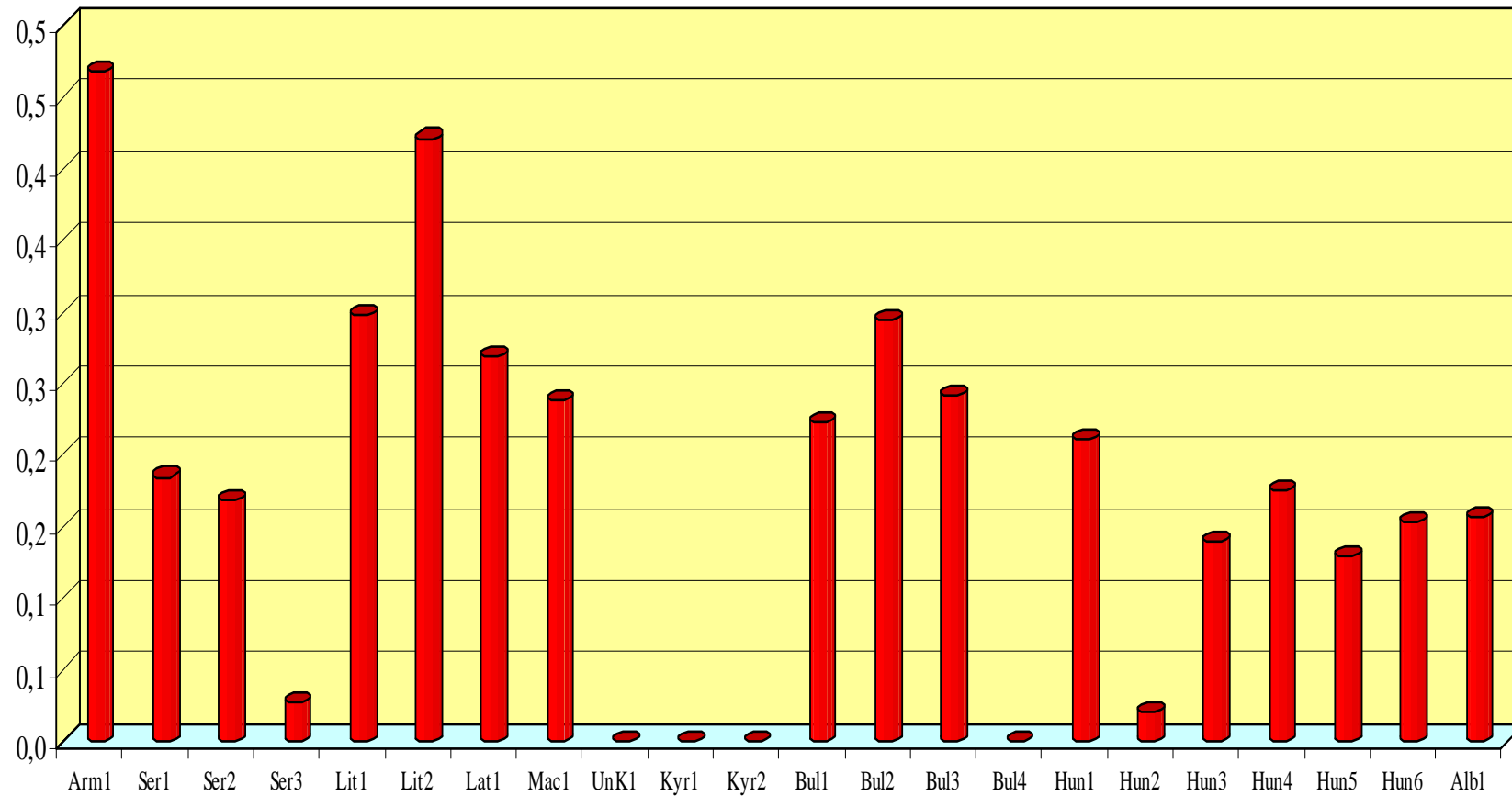
Uni – dimensional indicators



V/1d PRESENTATION ON FINDINGS

Uni – dimensional indicators

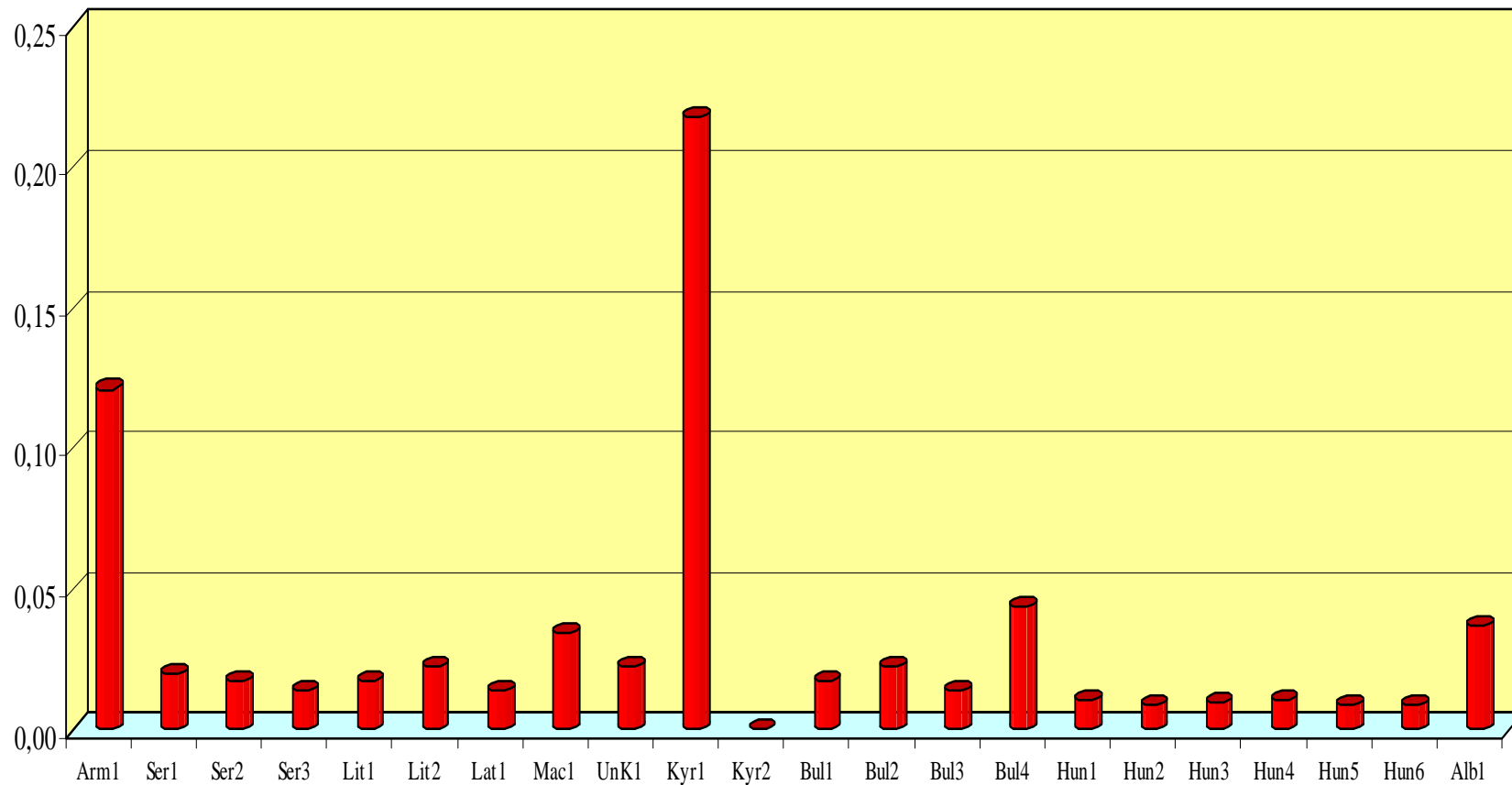
Sq. km Area / 000 US\$ Opex



V/1e PRESENTATION ON FINDINGS

Uni – dimensional indicators

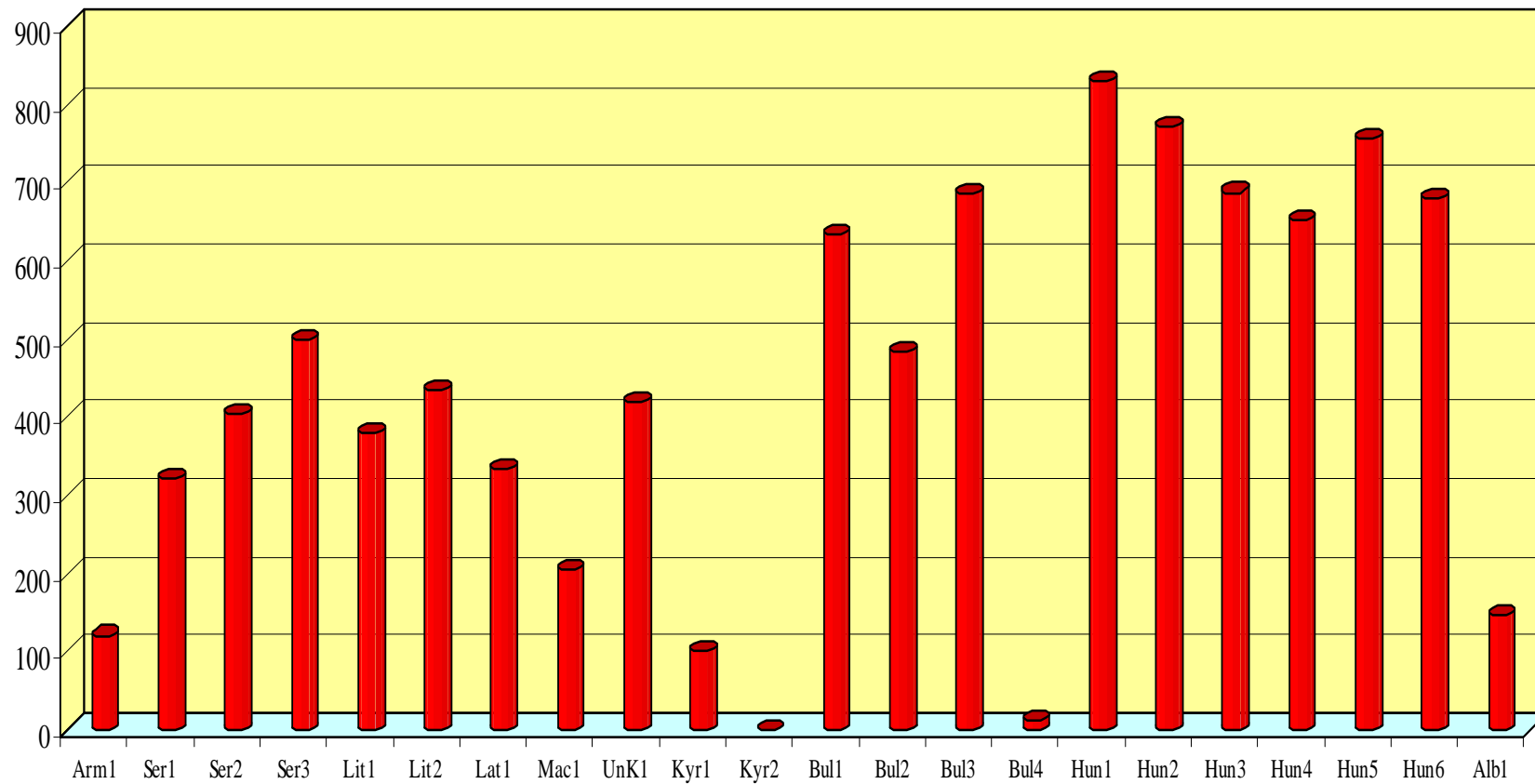
Employees / 000 US\$ Opex



V/1f PRESENTATION ON FINDINGS

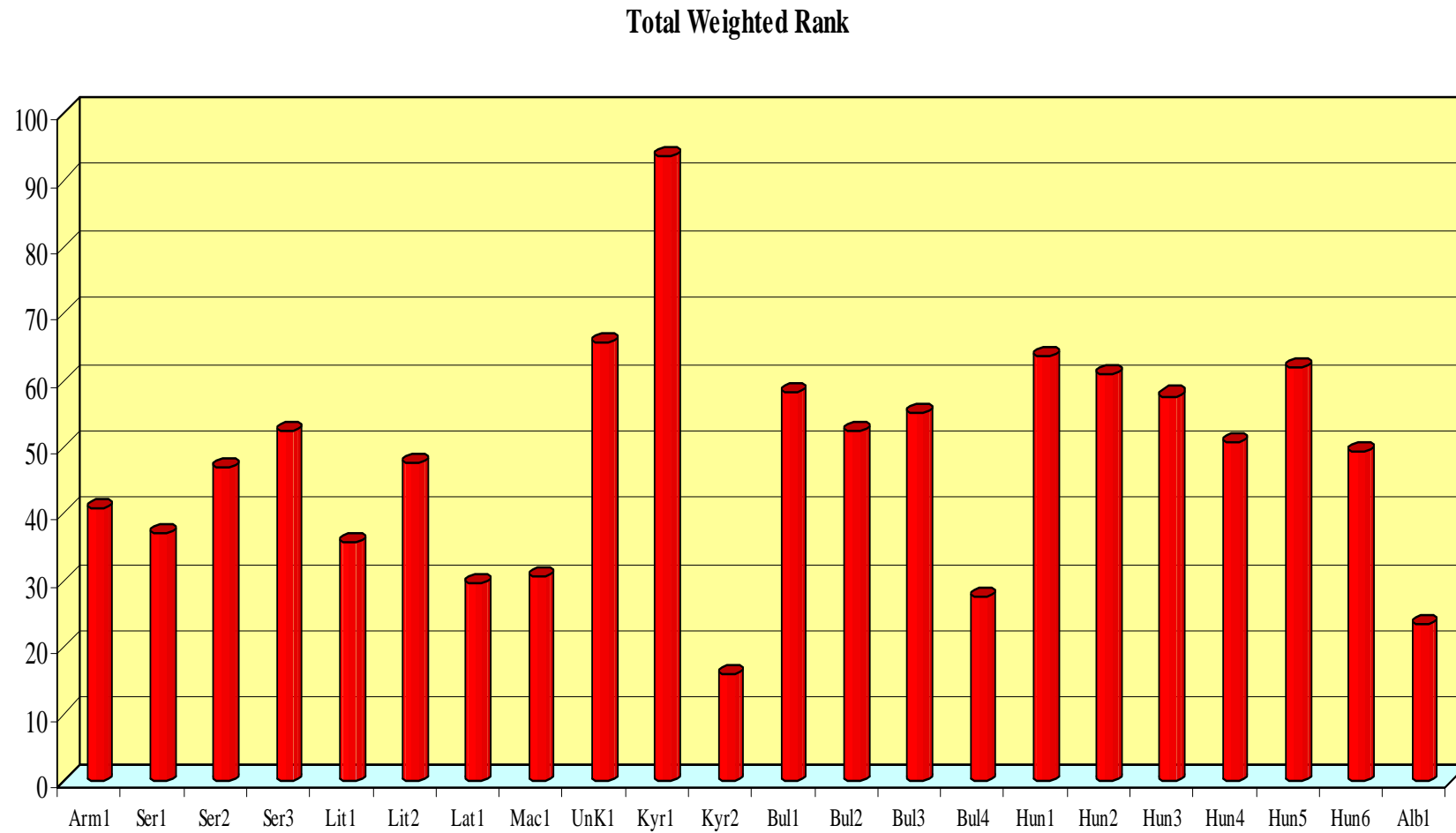
Uni – dimensional indicators

Customers / Employee



V/1g PRESENTATION ON FINDINGS

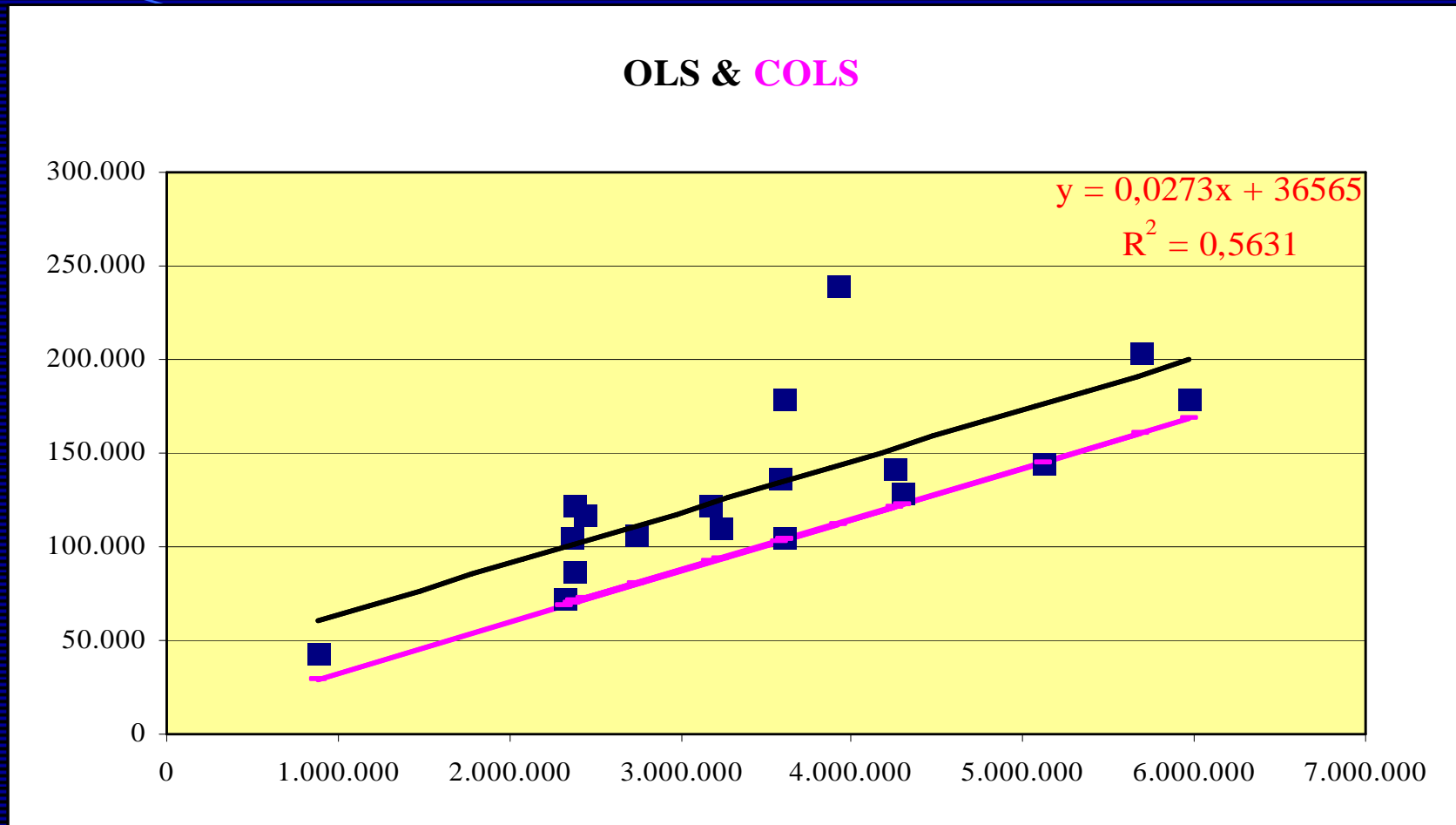
Uni – dimensional indicators



V/2a PRESENTATION ON FINDINGS

OLS & COLS regression lines

(an optimal sample: without Kyr1, Bul4, Arm1 and UnK1)

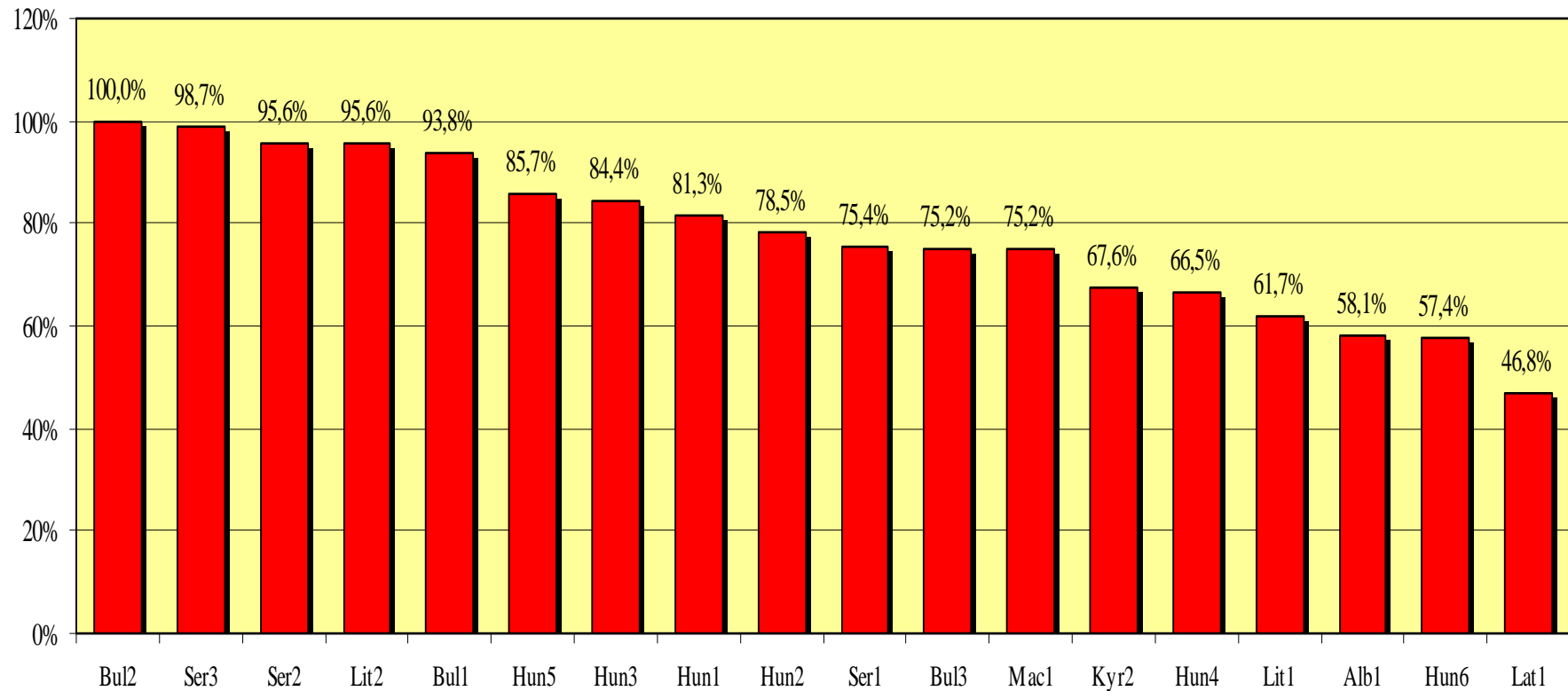


V/2b PRESENTATION ON FINDINGS

Ranking using COLS

(an optimal sample: without Kyr1, Bul4, Arm1 and UnK1)

Ranking using COLS

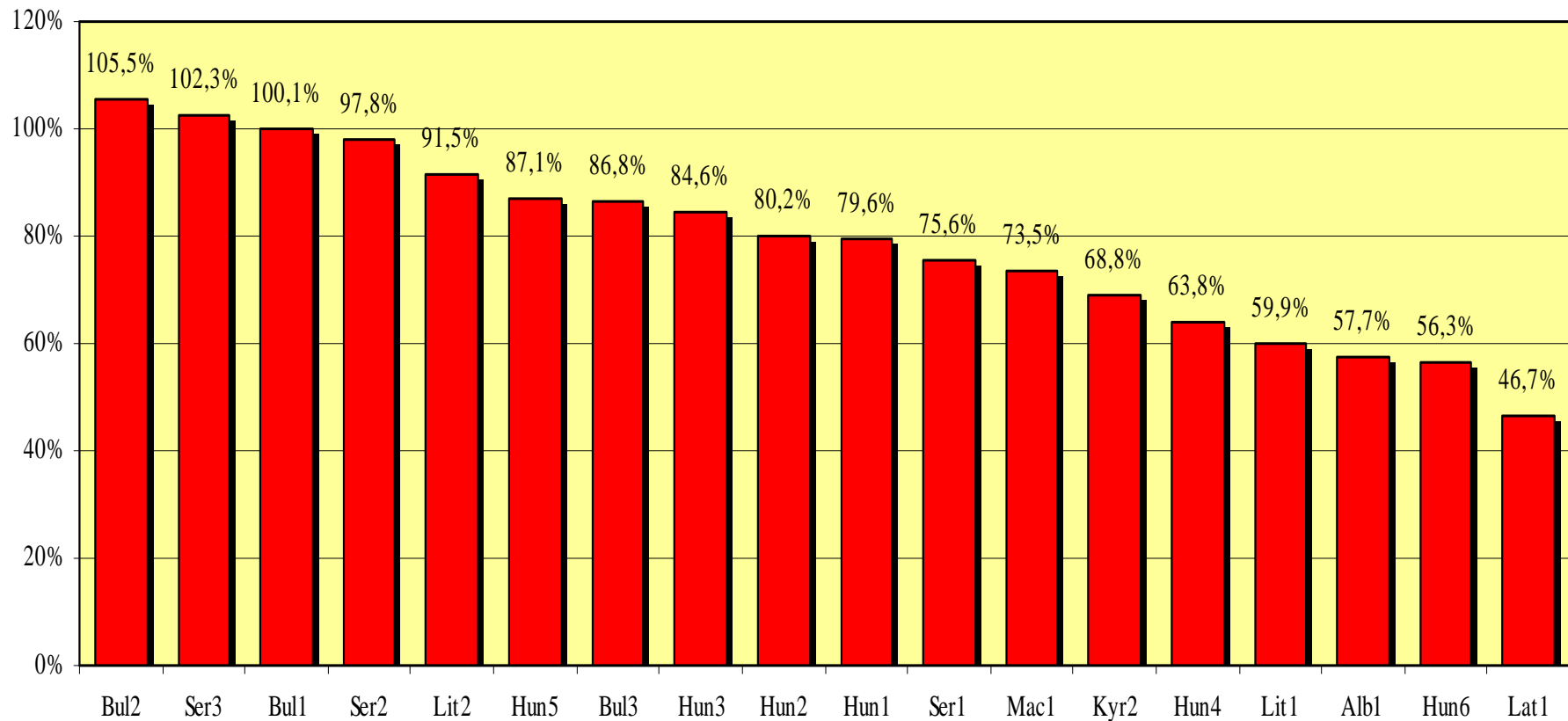


V/2c PRESENTATION ON FINDINGS

Ranking using DEA

(an optimal sample: without Kyr1, Bul4, Arm1 and UnK1)

Ranking using DEA



V/2d PRESENTATION ON FINDINGS

Ranking using all methods

(an optimal sample: without Kyr1, Bul4, Arm1 and UnK1)

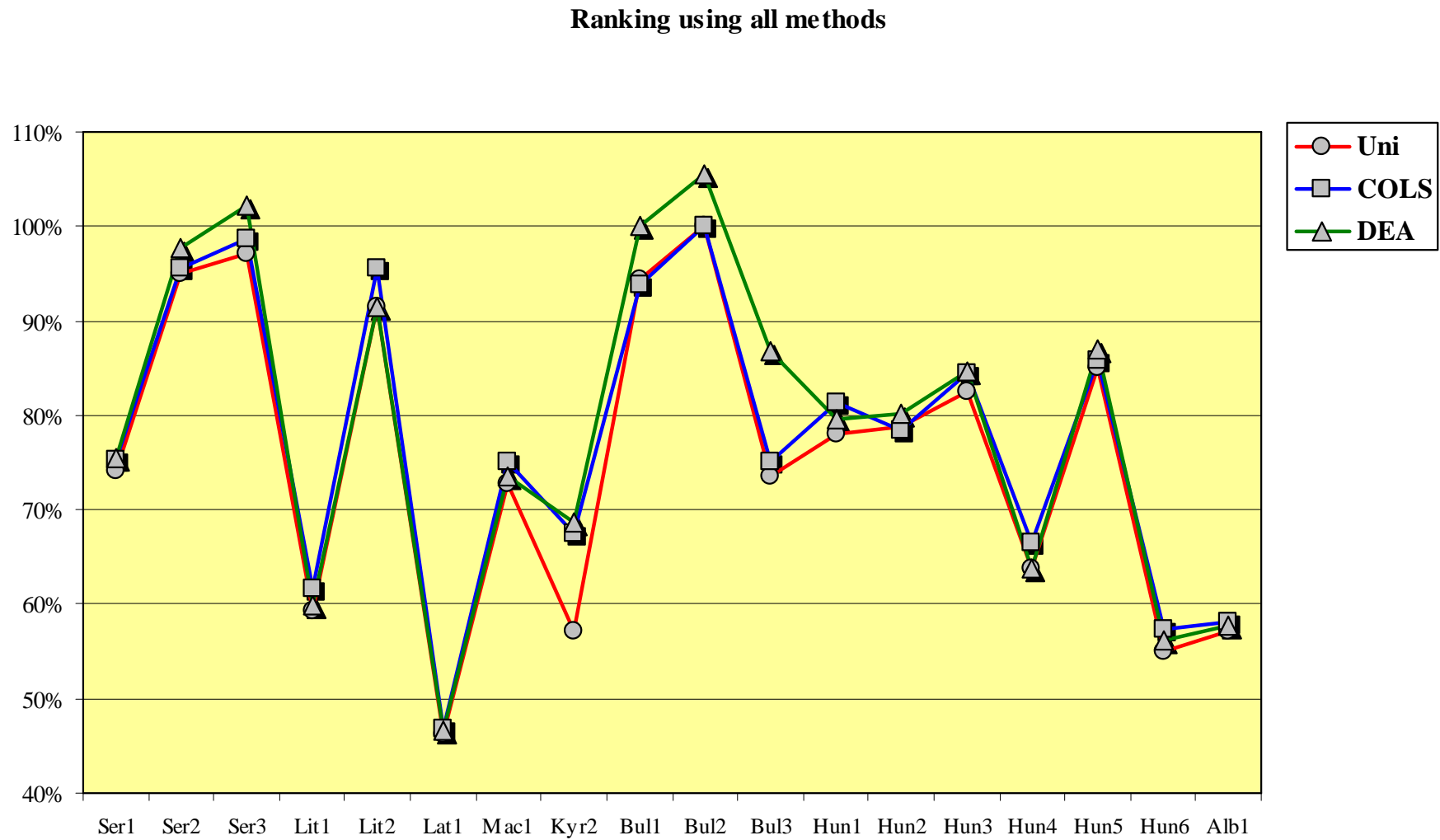
Uni-dimensional ^{x)}		COLS		DEA	
Rank	Score	Rank	Score	Rank	Score
Bul2	100,0%	Bul2	100,0%	Bul2	105,5%
Ser3	97,2%	Ser3	98,7%	Ser3	102,3%
Ser2	94,9%	Ser2	95,6%	Bul1	100,1%
Bul1	94,3%	Lit2	95,6%	Ser2	97,8%
Lit2	91,4%	Bul1	93,8%	Lit2	91,5%
Hun5	85,1%	Hun5	85,7%	Hun5	87,1%
Hun3	82,5%	Hun3	84,4%	Bul3	86,8%
Hun2	78,8%	Hun1	81,3%	Hun3	84,6%
Hun1	77,9%	Hun2	78,5%	Hun2	80,2%
Ser1	74,1%	Ser1	75,4%	Hun1	79,6%
Bul3	73,5%	Bul3	75,2%	Ser1	75,6%
Mac1	72,8%	Mac1	75,2%	Mac1	73,5%
Hun4	63,7%	Kyr2	67,6%	Kyr2	68,8%
Lit1	59,2%	Hun4	66,5%	Hun4	63,8%
Alb1	57,1%	Lit1	61,7%	Lit1	59,9%
Kyr2	57,1%	Alb1	58,1%	Alb1	57,7%
Hun6	55,0%	Hun6	57,4%	Hun6	56,3%
Lat1	46,3%	Lat1	46,8%	Lat1	46,7%

Note: x) Weighted factor: 50% MWh/Opex and 50% Customers/Opex

V/2d PRESENTATION ON FINDINGS

Ranking using all methods

(an optimal sample: without Kyr1, Bul4, Arm1 and UnK1)



VI SUGGESTED ACTIVITIES IN THE FUTURE AND THEIR TIMING

- **Proceed with data collection. It is possible to decrease the volume of necessary data only to 2007, including only 1-3 representative electricity distribution companies.**
- **If Tariff / Pricing Committee concludes that results of this topic are applicable and useful, the database can be updated with new data every year, which might become the permanent activity of Tariff / Pricing Committee, as well as Tariff Database.**

THANK YOU FOR YOUR ATTENTION

Energy Agency of the Republic of Serbia

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