



# Land Use Planning and Business Models for Urban Distribution Centers

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# **The Institute of Logistics and Warehousing Poznań - Poland**

***We develop, promote and implement  
logistics solutions that facilitate business  
operations***





## Profile

**R&D activities in public sector are commissioned by:**

- **The Ministry of Economy**
- **The Ministry of Infrastructure**
- **The State Committee for Scientific Research**





## Core competences

- **Logistics Management Consulting**
- **Supply Chain Logistics**
- **Macro-logistics Systems**
- **e-business**





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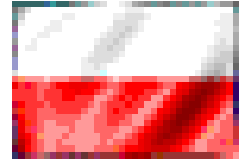
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**Logistics knowledge networking and dissemination**





## ***Logistics Centers in Poland***

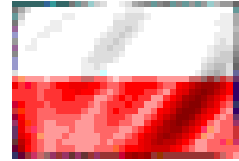


### **The State's goal**

To balance the transportation system technically, spatially, economically, socially and environmentally, concerning the circumstances of developing economy and international competition.

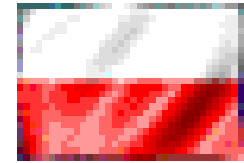


## ***Logistics Centers in Poland***

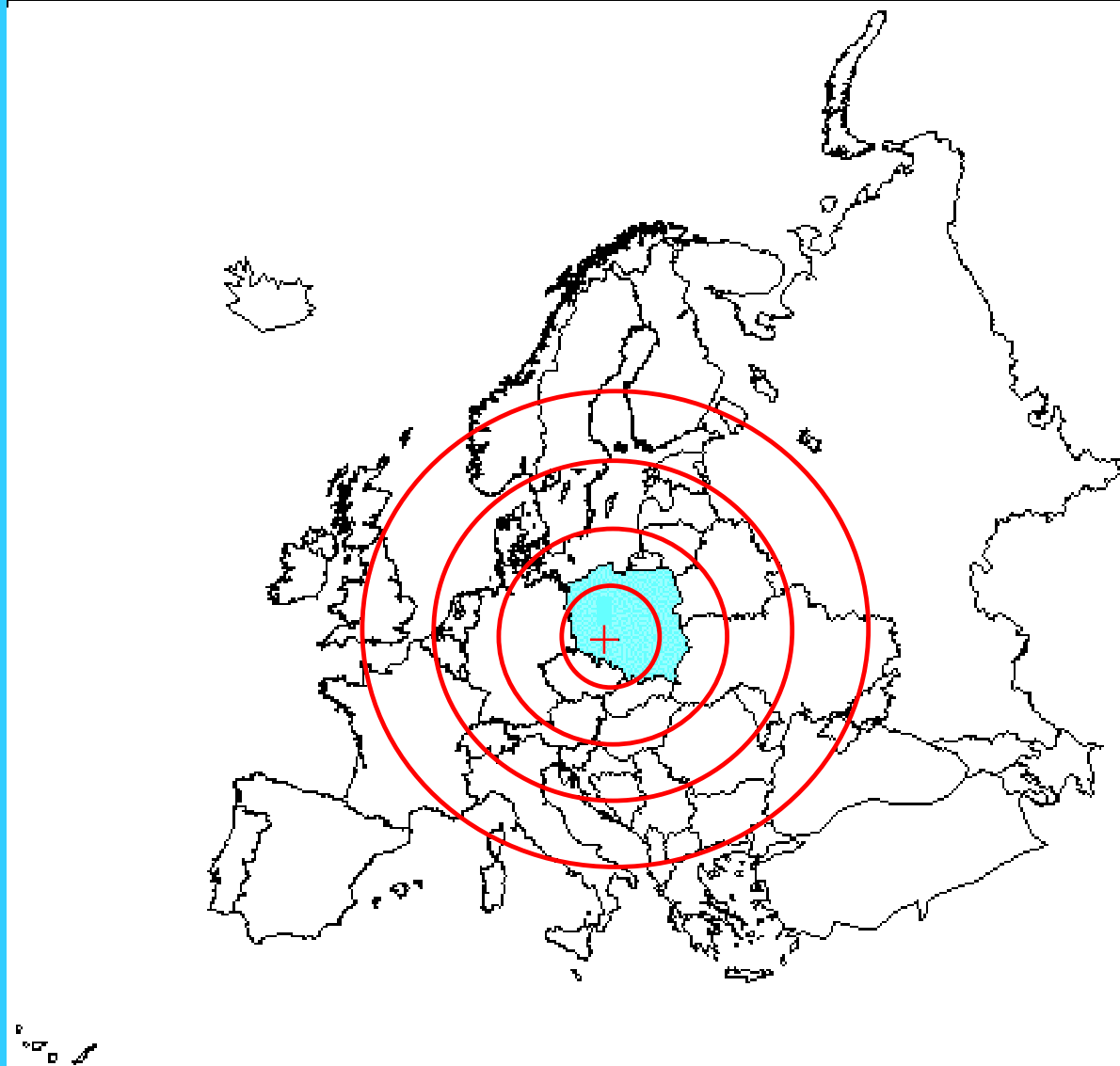


### **Strategic Goals:**

- The newly built logistics centers should be an element of national plan of integrated network of logistics centers
- The plan should consider their integration with functioning European logistics centers



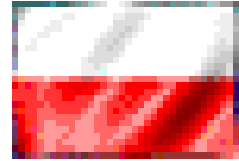
***Europe***  
***Poland***  
***Opole***







# *Workplan*



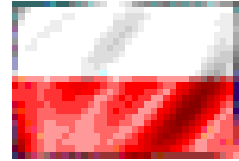
**Stage 1 – Goods flow identification**

**Stage 2 – Location study**

**Stage 3 – Feasibility study**



## ***Stage I – Goods flow identification***



### **Tasks:**

Goods flows analysis were carried on the basis of:

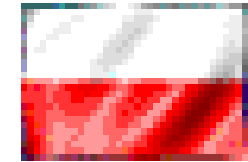
- deliveries structure in goods distribution processes,
- volumes of goods import and export for Opole voivodship
- volume of goods flow within the region.

### **The goal:**

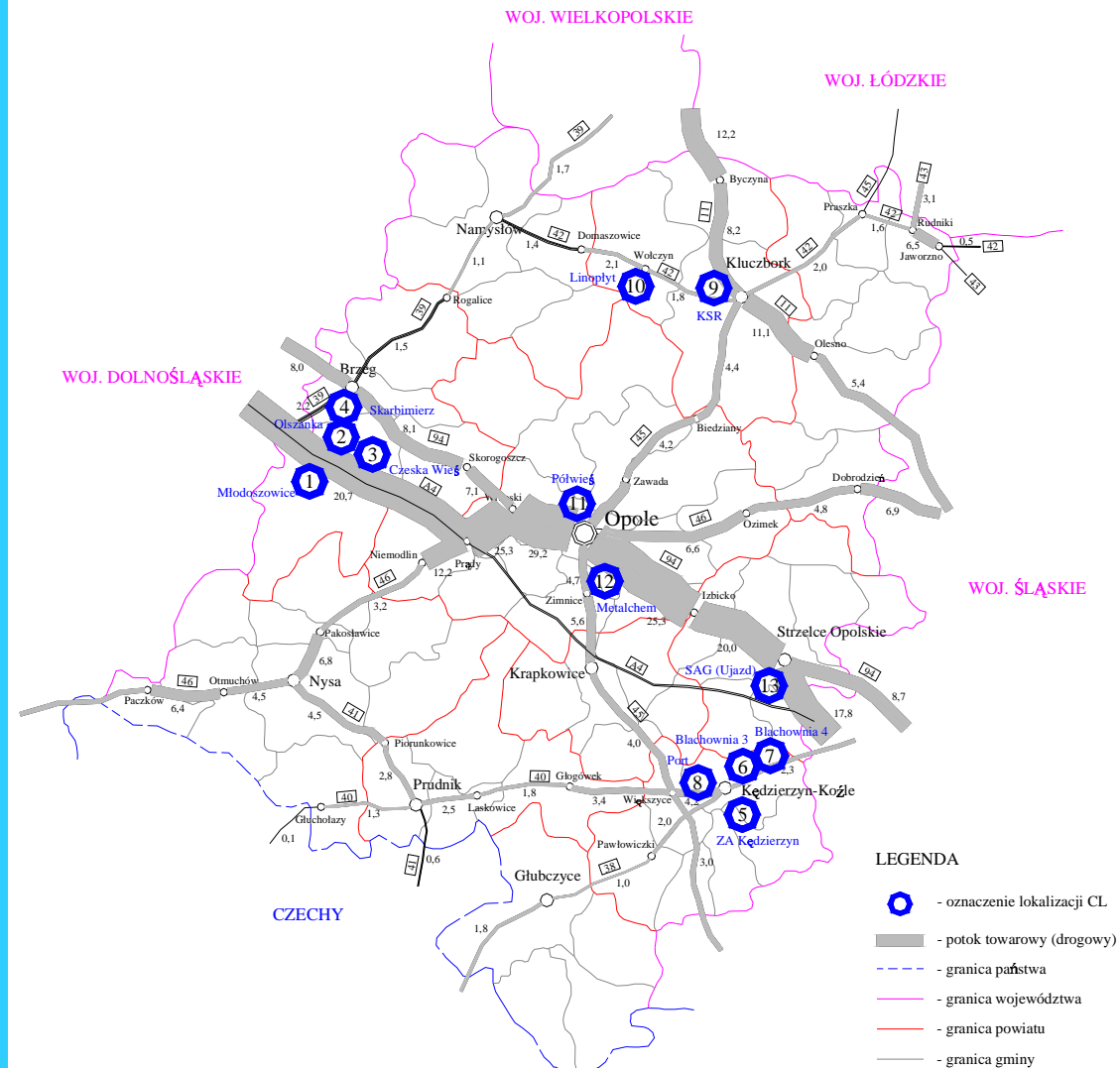
To estimate goods flow to be serviced by the Opole Logistics Center



# Stage I – Goods flow identification

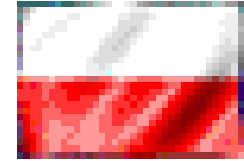


## Goods flows in motorway transport for Opole voivodship





## ***Stage I – Goods flow identification***



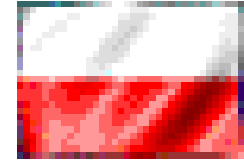
### **Forecasted volume of goods flow for the Opole Logistics Center**

<b>Goods streams in following years</b>	<b>2004</b>	<b>2007</b>	<b>2010</b>	<b>2013</b>	<b>2016</b>	<b>2018</b>
Total road transportation [tons]	4 939 392	5 548 639	6 208 385	6 622 340	7 409 752	8 028 265
GDP dynamics coefficient	103,84%	103,68%	104,09%	100,82%	104,09%	104,09%
Absorption coefficient	2,50%	4,00%	5,50%	7,00%	8,50%	9,50%
Good stream assumed to be serviced by the OLC [tons]	123 485	221 946	341 461	463 564	629 829	762 685

*The volume of streams serviced by OLC in 2004-2018 was estimated on the basis of GDP forecast and concerning the base absorption coefficient on the level of 2.5%*



## ***Stage I – Goods flow identification***

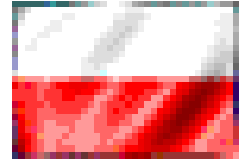


### **The share of stream volume according to the kind of services**

<b>Service</b>	<b>Goods stream in years [tons]</b>					
	<b>2004</b>	<b>2007</b>	<b>2010</b>	<b>2013</b>	<b>2016</b>	<b>2018</b>
Container service	12 352	22 201	34 157	46 371	63 003	76 292
Cross-docking	16 112	28 959	44 553	60 485	82 179	99 514
Warehousing and order picking	26 854	48 265	74 256	100 809	136 966	165 857
Warehouses renting	26 854	48 265	74 256	100 809	136 966	165 857
On yard storing	20 657	37 127	57 120	77 545	105 358	127 582
Store-yards renting	20 657	37 127	57 120	77 545	105 358	127 582



## ***Stage II – Location Study***



### **The goal:**

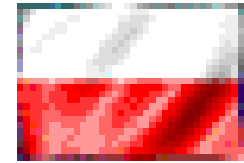
To estimate the optimal location for the logistics center for the voivodship of Opole.

### **Tasks:**

- to evaluate the need of creating the logistics center in the region
- to identify the role and function of the future logistics center
- to recommend logistics center's number within the voivodship

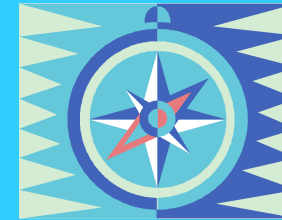


## ***Stage II – Location study***



### **Main groups of criteria for logistics centers locating:**

1. location (the location's abundance)



2. economical (the regions potential)

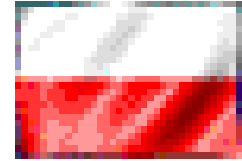


3. distributional (distribution costs)





## ***Stage II – Location study***



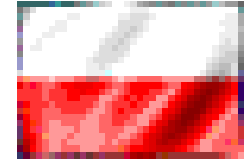
### **Issues to be recognized when analyzing potential locations:**

1. Land destination – spatial plan conformity
2. Land development – accessibility and efficiency of media
3. Ownership structure – lands' legal status
4. Infrastructure
5. Communication network accessibility





## *Stage II – Location study*

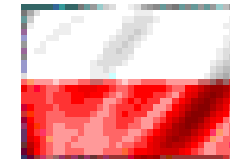


### **Locations to be verified**

<b>No.</b>	<b>Name</b>	<b>Commune</b>	<b>Powiat</b>
1	Młodoszowice – węzeł A4 „Przylesie”	Grodków	Brzeg
2	Olszanka – węzeł A4 „Przylesie”	Olszanka	Brzeg
3	Czeska Wieś - Jankowice	Olszanka	Brzeg
4	Skarbimierz - lotnisko	Skarbimierz	Brzeg
5	ZA "Kędzierzyn"	Kędzierzyn-Koźle	Kędzierzyn-Koźle
6	ZCh „Blachownia 3”	Kędzierzyn-Koźle	Kędzierzyn-Koźle
7	ZCh „Blachownia 4”	Kędzierzyn-Koźle	Kędzierzyn-Koźle
8	Port	Kędzierzyn-Koźle	Kędzierzyn-Koźle
9	Kluczborska Strefa Rozwoju (KSR)	Kluczbork	Kluczbork
10	ZPL „Linopłyt”	Wołczyn	Kluczbork
11	Półwieś	Opole	
12	ZACH „Metalchem”	Opole	
13	Strefa Aktywności Gospodarczej (SAG)- węzeł A4 „Olszowa”, „Nogawczyce”	Ujazd	Strzelce Opolskie



## Stage II – Location study

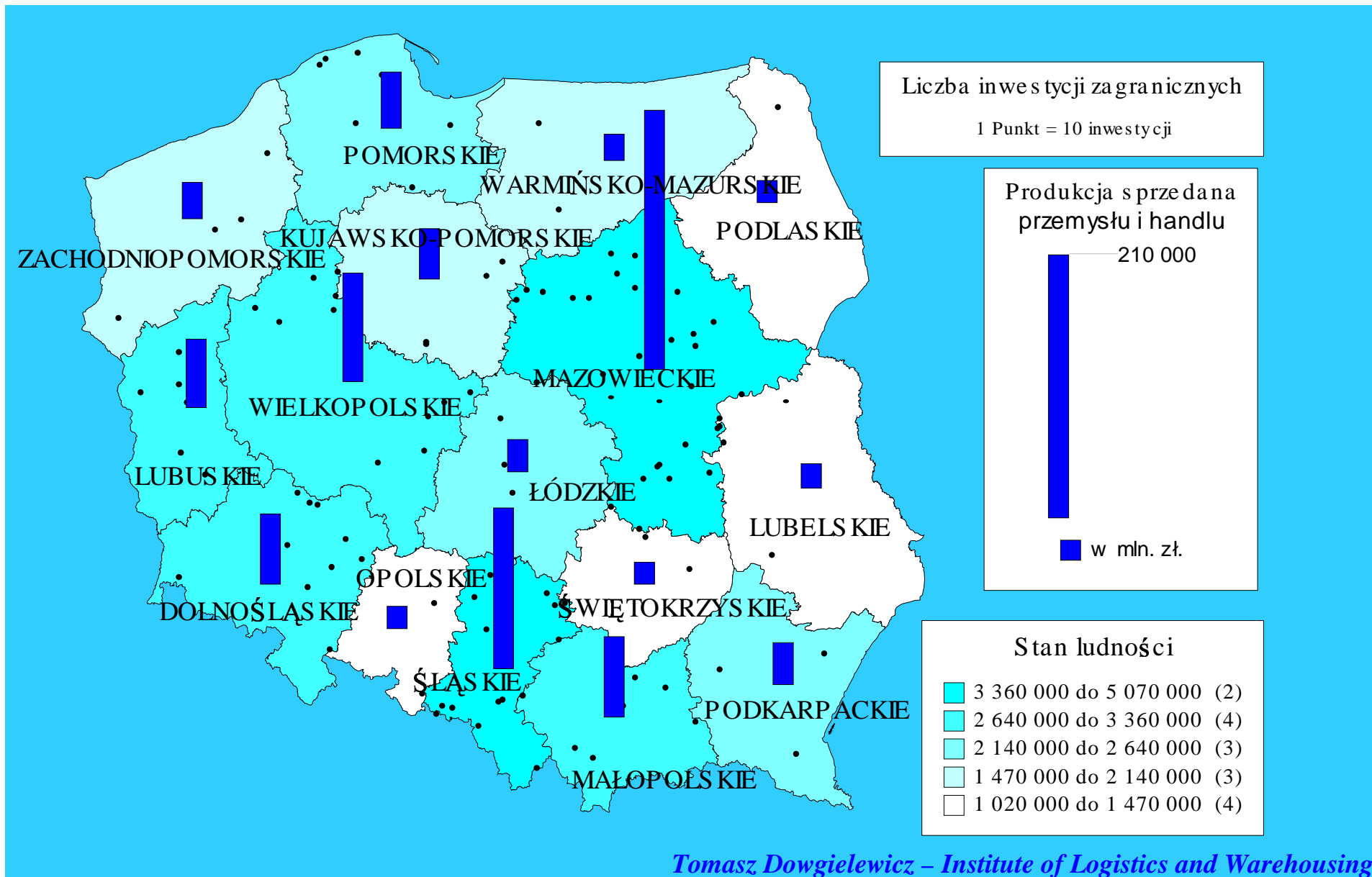


### Economical indexes

No.	Index	OPOLSKIE	ŚLĄSKIE	DOLNO-ŚLĄSKIE	POLAND
1	Population	1 080 505 (2,8%)	4 830 472 (12,5%)	2 970 094 (7,7%)	38 632 453 (100%)
2	Working population per 1000 people	326,2	349,1	328,2	379,7
3	GDP [millions of PLN]	16 458,2 (2,4%)	94 773,1 (13,8%)	54 516,0 (8%)	684 981,9 (100%)
4	GDP per capita [PLN]	15 146	19 509	18 324	17 725
5	Investments expenditures [millions of PLN]	2 217,2 (1,8%)	12 573,1 (10,4%)	11 012,0 (9,1%)	121 362,9 (100%)
6	Investments expenditures per capita [PLN]	2 048	2 598	3 706	3 141
7	Sold industry production [millions of PLN]	12 530,3 (2,5%)	84 174,8 (16,8%)	35 940,6 (7,2%)	500 780,7 (100%)
8	Sold industry production per capita [PLN]	11 573	17 391	12 096	12 960
9	Goods retail sales per capita [PLN]	6334	9 154	7 328	9 716
10	Average gross salary [PLN]	1 865,5	2 094,4	1 973,4	2 045,1
11	Unemployment rate	18,2%	15,7%	21,5%	17,5%
12	Number of foreign investments over 1 M\$	39 (1,9%)	266 (12,4%)	175 (8,1%)	2 149 (100%)

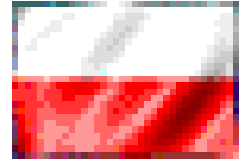


# Stage II – Location study





## ***Stage II – Location study***



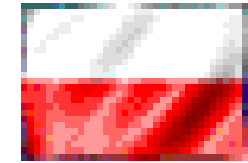
### **Analysis of logistics distribution costs**

The logistics costs analysis of distribution centers functioning was carried on the basis of the Institute's methodology. It was estimated regarding the following:

- real structure of goods stream flow**
- costs indexes of the second half of 2002**
- issuing point located in Germany**
- receiving points in all voivodship capitals of Poland**



## Stage II – Location study

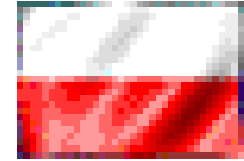


### Locations rank according to logistics costs

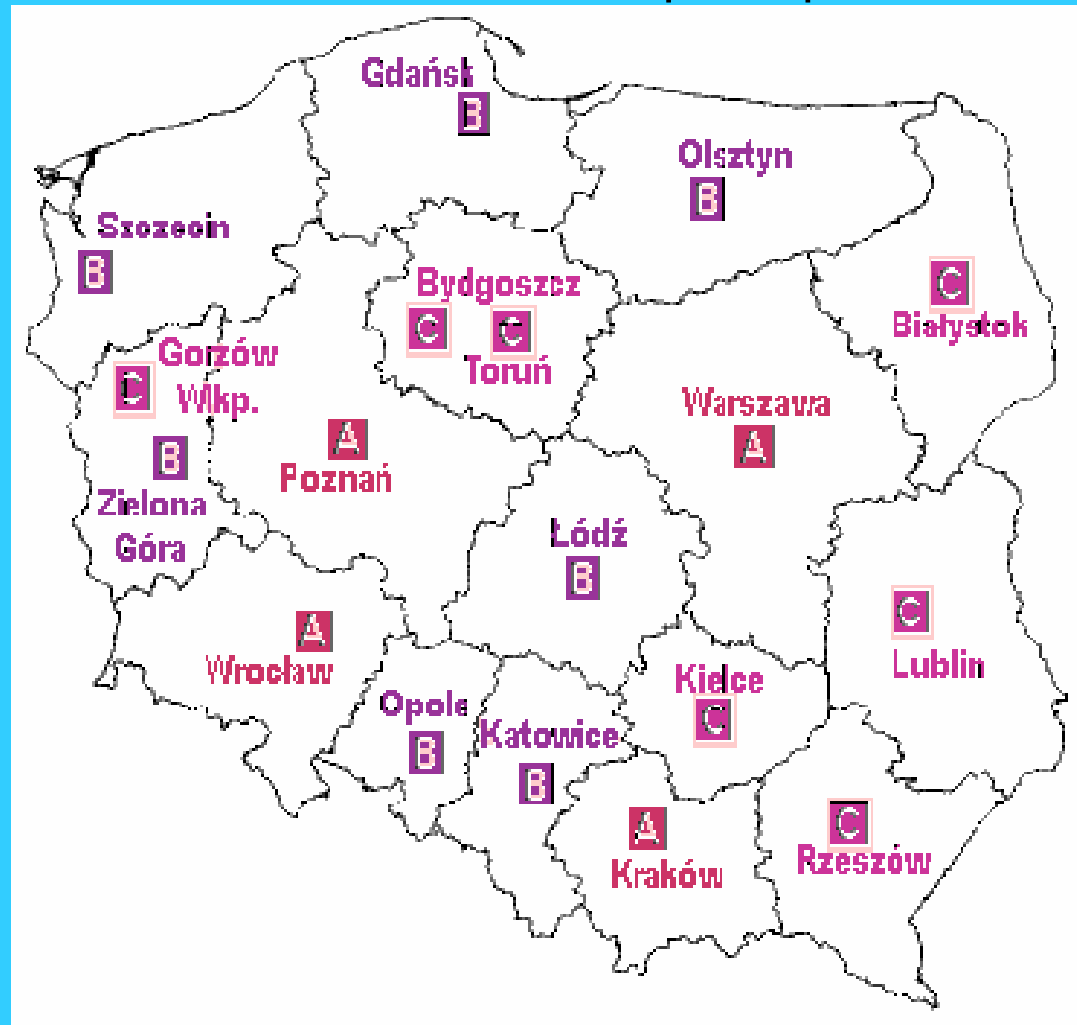
Rank	Location	Transport costs	Warehousing costs	Distribution costs	TOTAL	The cheapest location = 100
		[tys. PLN]	[tys. PLN]	[tys. PLN]	[tys PLN]	
1	Wrocław	2 031,7	172,2	506,6	2 710,5	100,0
2	Opole	2 053,4	162,9	506,6	2 722,9	100,5
3	Bydgoszcz	2 053,4	163,8	506,6	2 723,8	100,5
4	Poznań	2 053,4	174,1	506,6	2 734,2	100,9
5	Zielona Góra	2 031,7	163,0	606,0	2 800,8	103,3
6	Łódź	2 276,2	172,3	409,7	2 858,2	105,4
7	Kielce	2 296,0	161,6	441,8	2 899,4	107,0
8	Katowice	2 276,2	171,7	506,6	2 954,5	109,0
9	Warszawa	2 296,0	228,2	441,8	2 966,0	109,4
10	Kraków	2 296,0	166,6	506,6	2 969,2	109,5
11	Szczecin	2 031,7	176,6	774,3	2 982,7	110,0
12	Gdańsk	2 227,6	179,4	639,4	3 046,5	112,4
13	Olsztyn	2 296,0	165,5	639,4	3 100,9	114,4
14	Lublin	2 454,8	165,0	539,6	3 159,5	116,6
15	Rzeszów	2 454,8	158,8	606,0	3 219,6	118,8
16	Białystok	2 454,8	166,2	639,4	3 260,5	120,3
Country avg.		2 224,0	171,7	548,6	2 944,3	108,6
Costs share		75,6%	5,8%	18,6%	100,0%	



## Stage II – Location study



Investment attractiveness for voivodships' capitals in Poland



Source: Institute of Market Economy Research

Tomasz Dowgielewicz – Institute of Logistics and Warehousing



## Stage II – Location study



### Pan European transport corridors

#### Corridor I:

Warszawa - Białystok - Suwałki  
- z odgałęzieniem: - Elbląg -  
Gdańsk;

#### Corridor II:

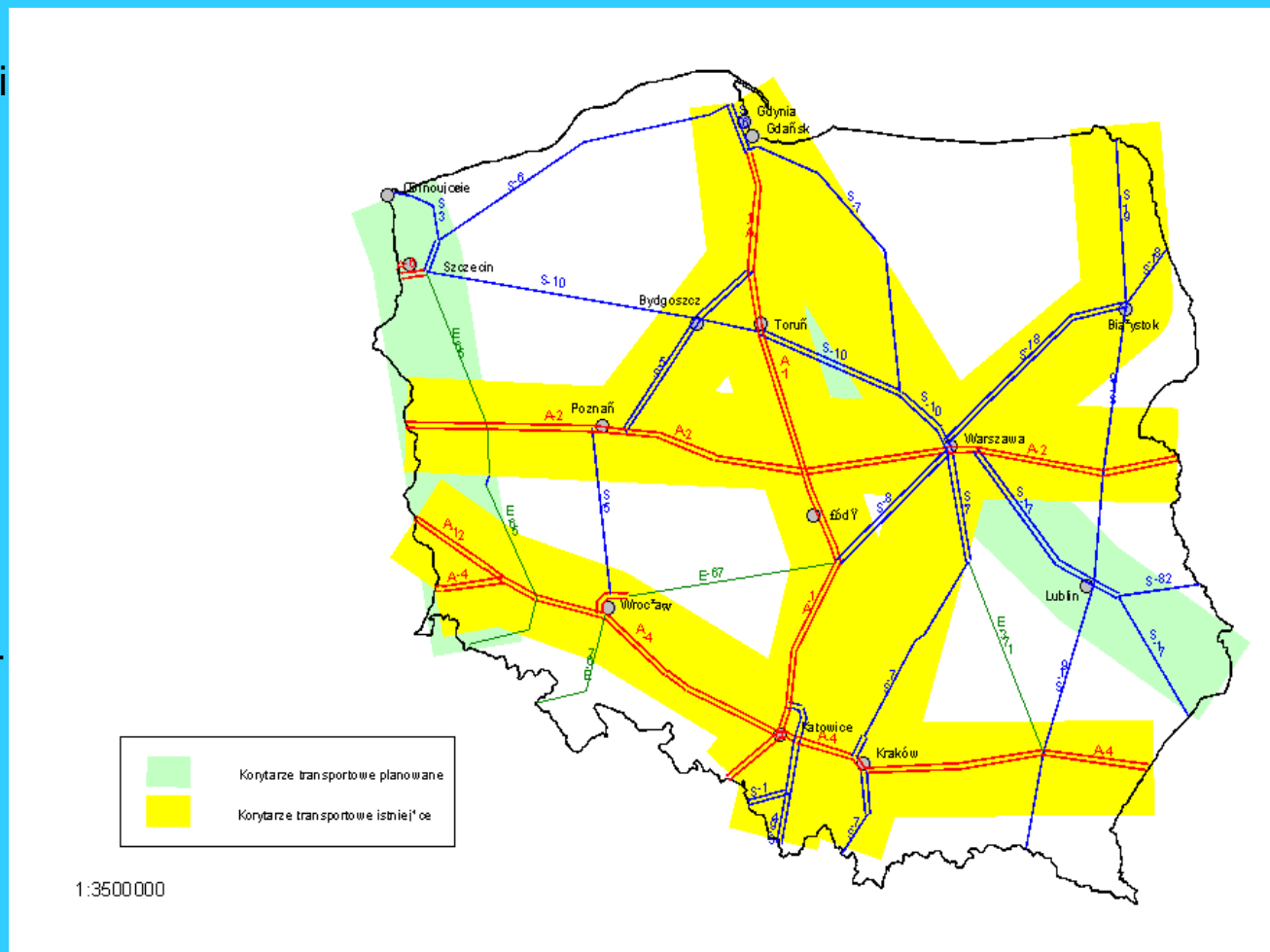
Świecko - Poznań - Warszawa  
– Terespol;

#### Corridor III:

Zgorzelec - Wrocław - Opole -  
Katowice - Kraków - Rzeszów -  
Medyka;

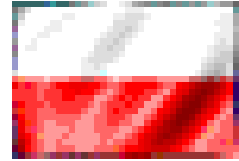
#### Corridor IV:

Gdańsk/Gdynia - Warszawa -  
Katowice – Zwardoń – Poznań  
- Katowice





## *Stage II – Location study*



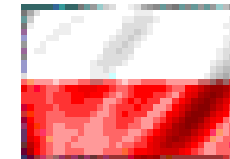
### **CONCLUSIONS**

- ❑ The necessity of building a logistics center within Opole voivodship has been proved
- ❑ It should operate within and for the city of Opole having regional character
- ❑ It should co-operate with another logistics centers in Poland
- ❑ Within international operability it should co-operate with the closest international logistics center that has international character





## Stage II – Location study

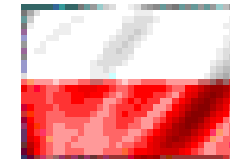


### Final result

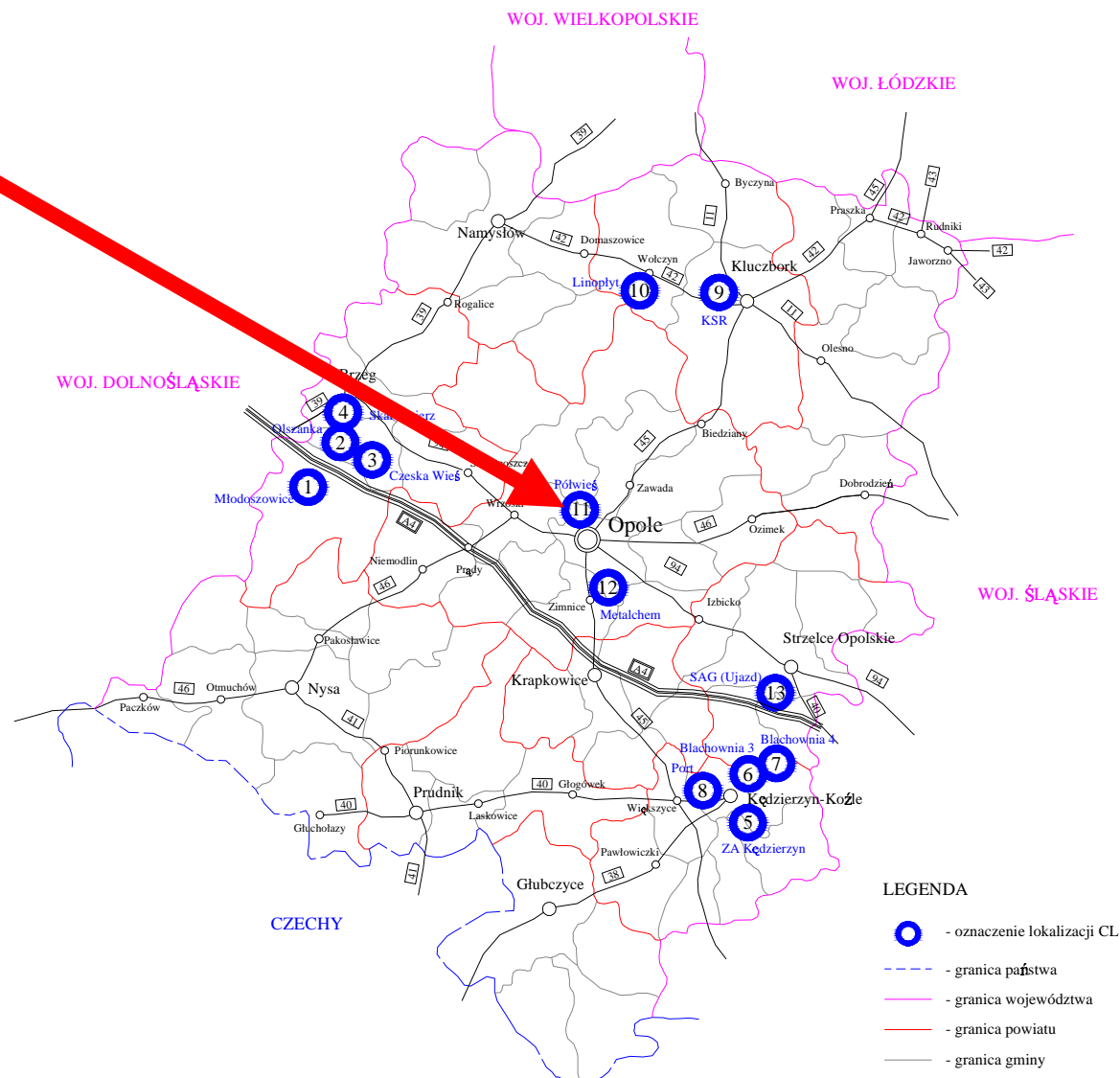
Lokalizacja		Kryterium			Łącznie
		lokalizacyjne	gospodarcze	dystrybucyjne	
Brzeg	Skarbimierz	0,5	0,5	0	1
	Młodoszowice	0,5	0,5	0	1
	Przylesie	0,5	0,5	0	1
	Czeska Wieś	0	0,5	0	0,5
	Strzelce Opolskie	1	0	0,5	1,5
Kędzierzyn-Koźle	ZAK	0,5	0	0	0,5
	Port	0,5	0	0	0,5
	Błachownia 3	1	0	0	1
	Błachownia 4	0,5	0	0	0,5
Opole	Półwieś	0	1	1	2
	Metalchem	0,5	1	1	2,5
Kluczbork	Linopłyt	0,5	0	0	0,5
	KSR	1	0	0	1



# Stage II – Location study

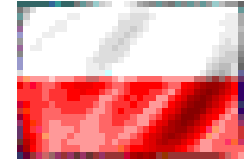


Location of the future logistics center





## ***Stage III – Feasibility study***



### **Goal:**

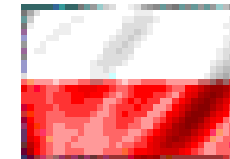
To estimate optimal organizational form of the center and economical effectiveness of the project.

### **Tasks:**

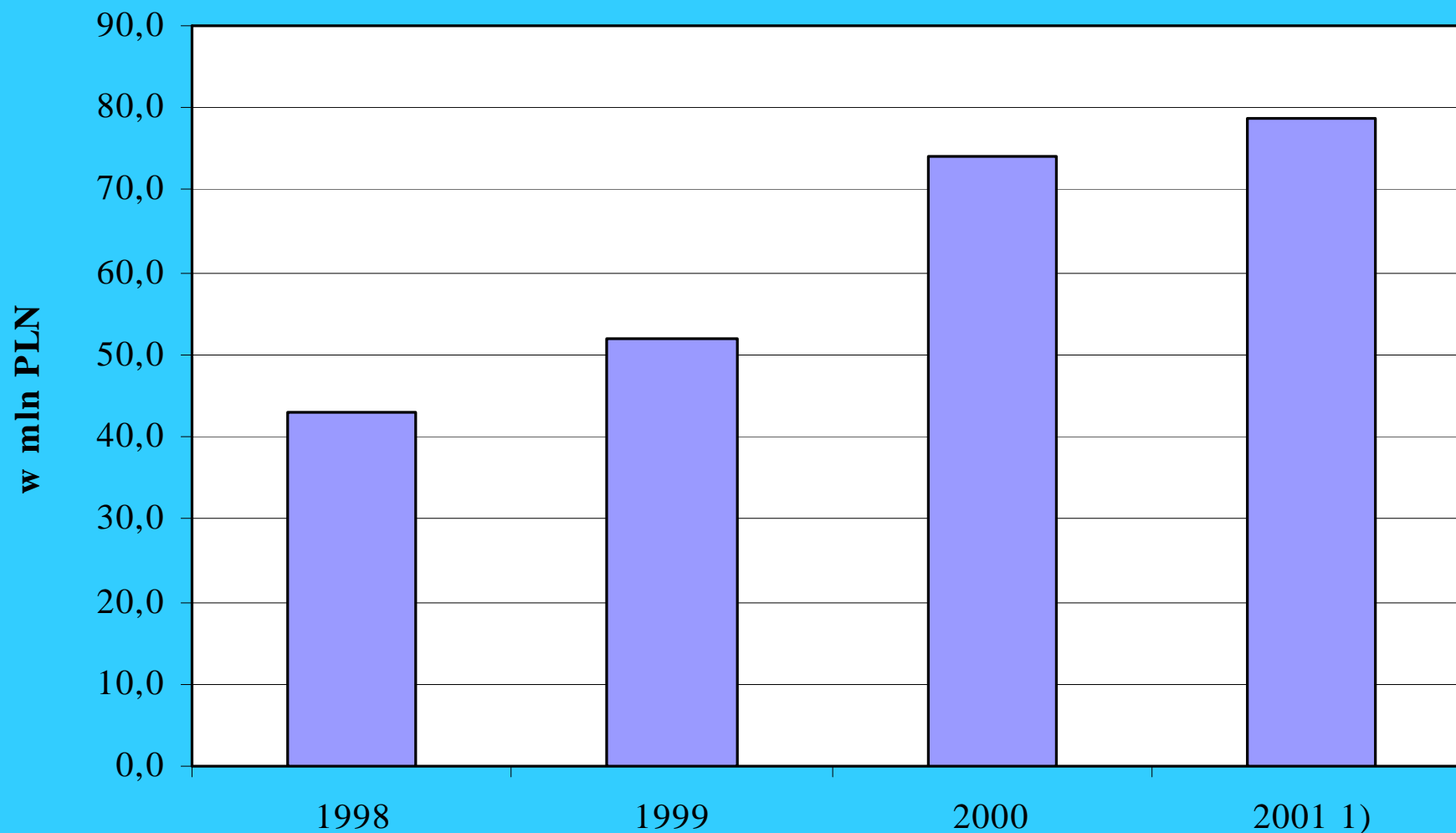
- logistics centers' market analysis in Poland and Europe
- defining the range of logistics services
- elaboration of the initial plan of OLC's development plan
- organizational forms' analysis
- impact on environment
- elaboration of 15 years financial forecast
- identification of possible financing sources
- evaluation of the investment's financial effectiveness



## *Stage III – Feasibility study*

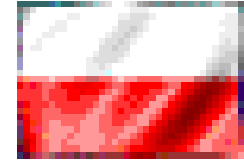


### **Incomes from logistics services sales**





## ***Stage III – Feasibility study***

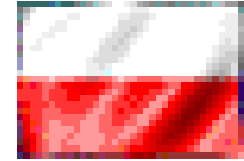


### **The range and stages of the investment**

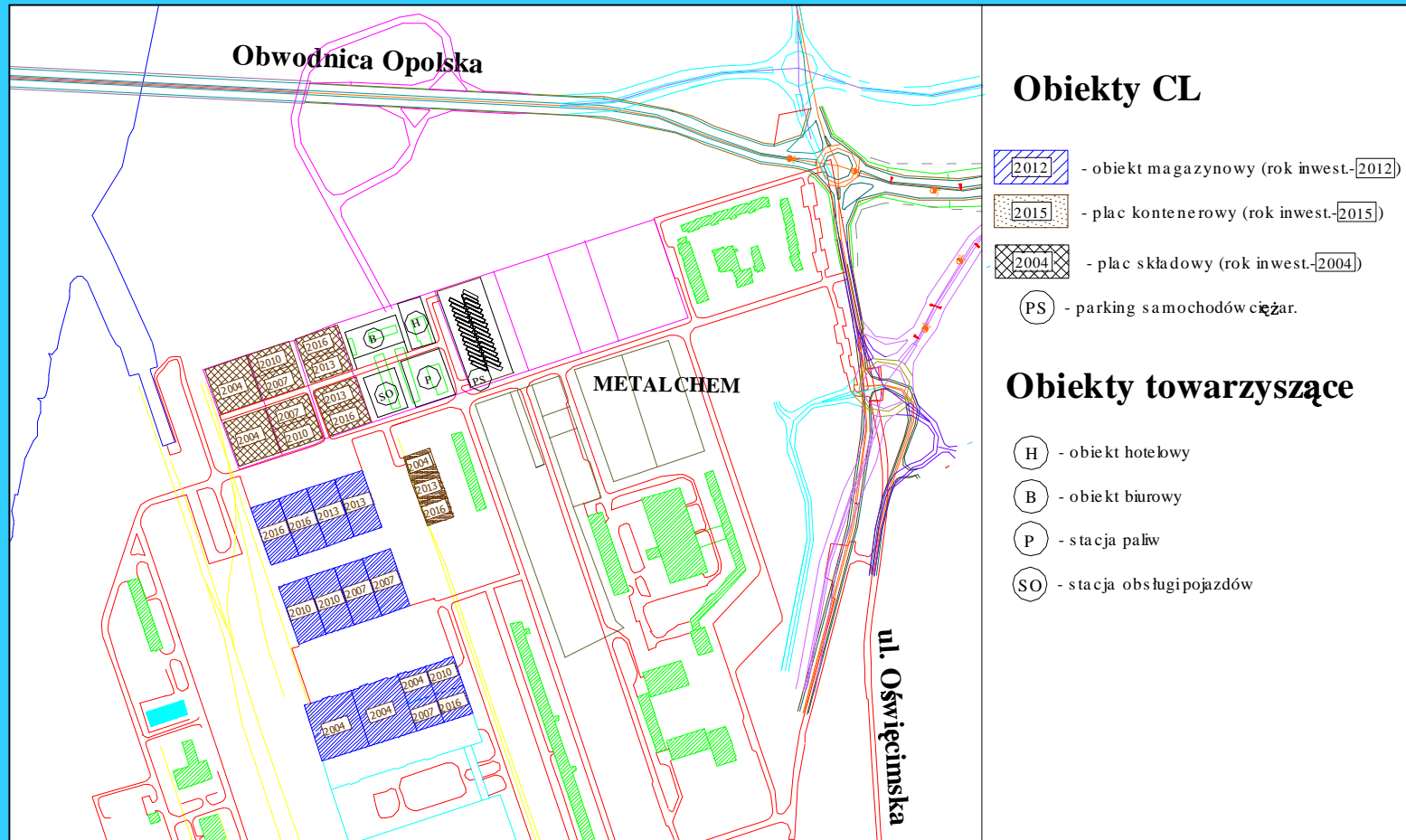
<b>Investment range</b>	<b>Unit</b>	<b>2004</b>	<b>2007</b>	<b>2010</b>	<b>2013</b>	<b>2016</b>	<b>Razem</b>
<b>Lands</b>	ha	5,3	2,1	0,8	2,1	0,8	<b>11,1</b>
<b>Warehouses</b>	m <sup>2</sup>	10 100	6 700	6 700	5 400	6 700	<b>35 600</b>
<b>Storing yards</b>	m <sup>2</sup>	6 400	3 100	3 100	3 100	3 100	<b>18 800</b>
<b>Container yard</b>	m <sup>2</sup>	1 000			1 000	1 000	<b>3 000</b>
<b>Maneuver yards and ways</b>	m <sup>2</sup>	9 600	3 450	3 450	2 850	2 800	<b>22 150</b>



# Stage III – Feasibility study

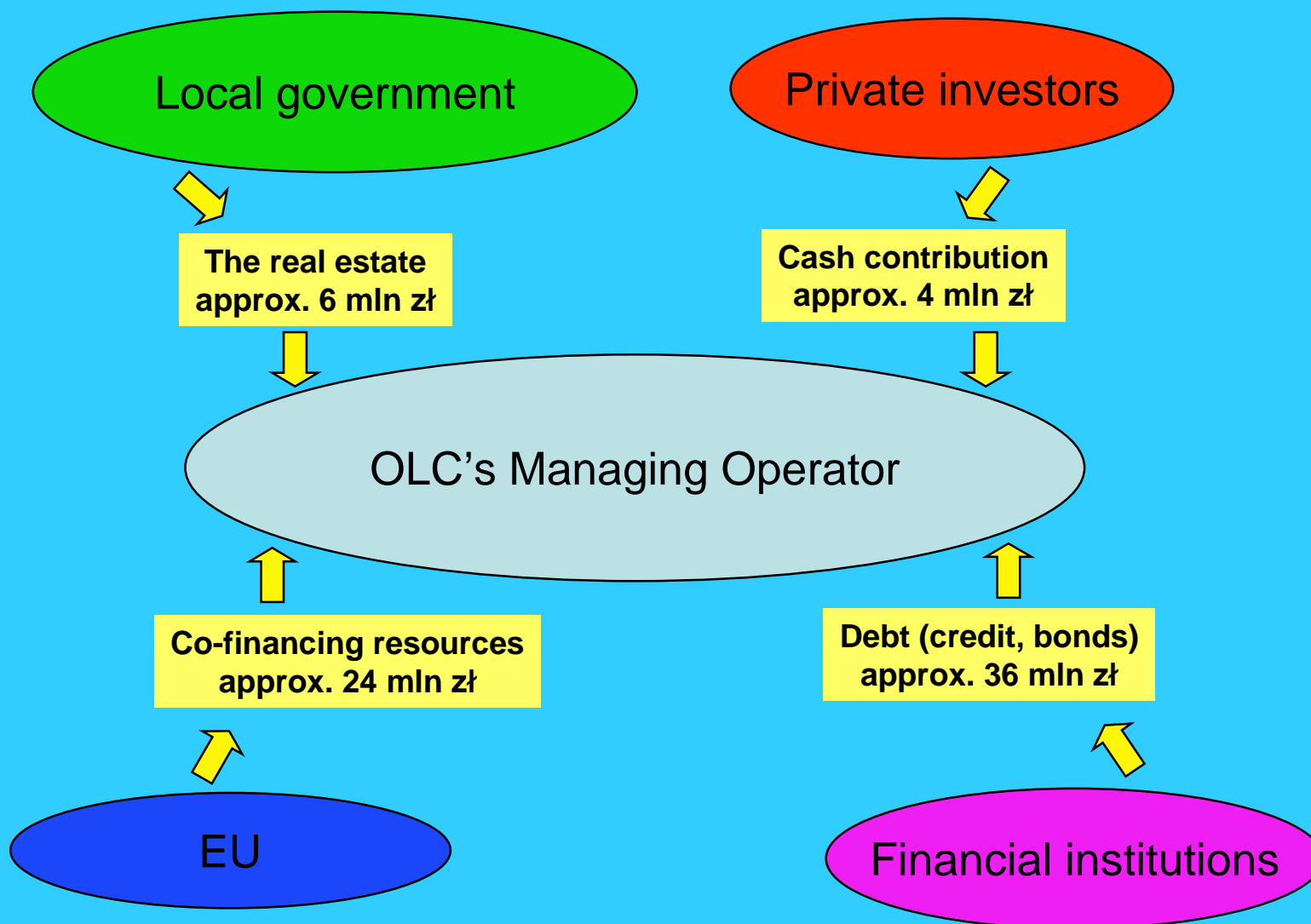


## Spatial development concept



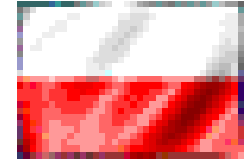


## Stage III – Feasibility study





## *Stage III – Feasibility study*



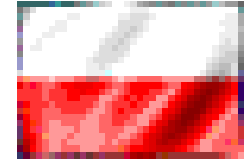
### **Utilization costs of the Opole LC (2004-2018)**

<b>Category</b>	<b>Costs (2004 - 2018) [EUR]</b>
Direct costs	14 258 120
Warehouses	12 397 269
Hiring service	790 693
cross-docking service	4 164 259
picking service	7 442 319
Storing yards	1 311 827
yards service	1 241 964
Hiring service	69 862
Container yards	476 737
Parking lots	72 285
Space renting	-
Management costs	5 703 255
Unexpected costs reserve	998 068
Depreciation	4 535 975
<b>Total costs</b>	<b>25 402 387</b>





## ***Stage III – Feasibility study***

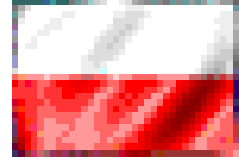


### **Income of the Opole LC (2004-2018)**

<b>Category</b>	<b>Incomes (2004 - 2018) [EUR]</b>
<b>Total income</b>	<b>46 195 013</b>
Warehouses	40 235 394
Hiring service	8 820 301
Cross-docking service	10 734 977
picking service	20 680 116
Storing yards	3 434 037
yards service	1 920 698
Hiring service	1 513 340
Containers yards	2 525 581
Parking lots	96 279
Space renting	-



## ***Stage III – Feasibility study***

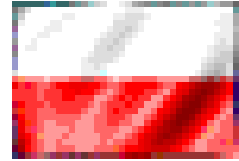


### **Investment Expenditures of the Opole LC (2004-2018) [EUR]**

0 Grounds	1 030 912
1 Buildings	10 655 743
2 Objects of land engineering	1 278 534
7 Means of transport	2 697 132
8 Tools, movables and equipment	442 791
<b>TOTAL</b>	<b>16 105 112</b>



## ***Stage III – Feasibility study***

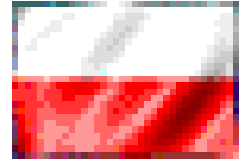


**Internal Return Rate of the investment project for  
Opole LC (independent of the financial source)**

Internal Return Rate	
IRR	13,7 %



***THE END***



***Thank you for your attention***

All questions concerning the presentation  
please refer:

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