

Learning from Wroclaw: How the City Benefits from Urban Resilience Enhancements

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2018

***City Resilience Program
Financial Solutions for City Resilience:
Cohort 2***

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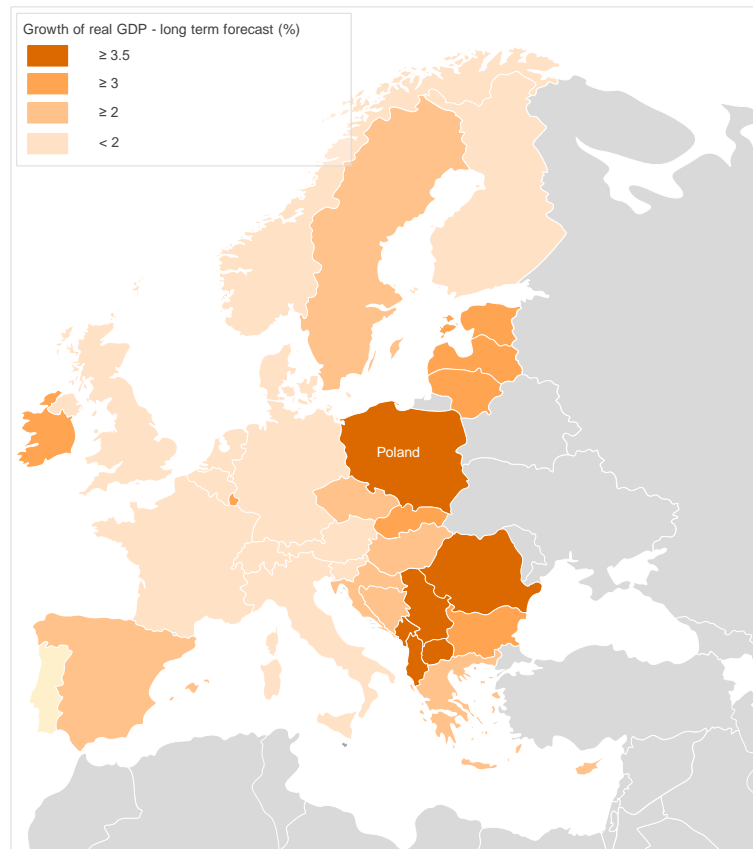
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Let us invite you to a journey to Central Europe – to one of the most exciting places in Poland – the City of Wrocław

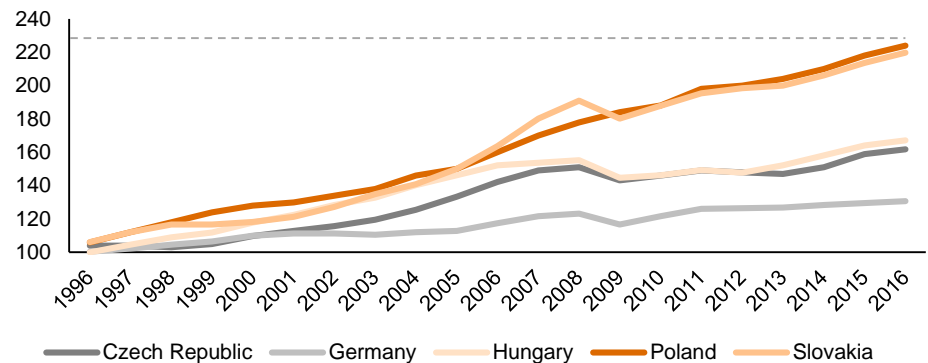


Poland is Europe's growth champion. Wroclaw is the 3rd largest city in Poland with around 630 thousand inhabitants

Long term real GDP growth forecast in selected countries



GDP per capita (real growth rate: 1995: 100)



1997

59th in the world
with GDP per
capita (PPP) equal
to USD8,900



2017

46th in the world
with GDP per
capita (PPP) equal
to USD29,000



Source: EIU, IMF, WB
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Agenda

1

Urban resilience as one of the key factors influencing economic growth

2

Resilience challenges: Wroclaw case - flood risk

3

Wroclaw response to flood risk

4

How did Wroclaw leverage on investments in urban resilience?

5

Key considerations for project implementation based on ORFPP Project

6

Key takeaways

Why urban resilience? Because cities matter the most

Cities:

- generate **85%** of global GDP,
- consume **75%** of the world's natural resources and
- account for **80%** of global greenhouse gas emissions.

Today 7.3 billion people live and work in only 7.6% of the global land mass.



7.3 bn



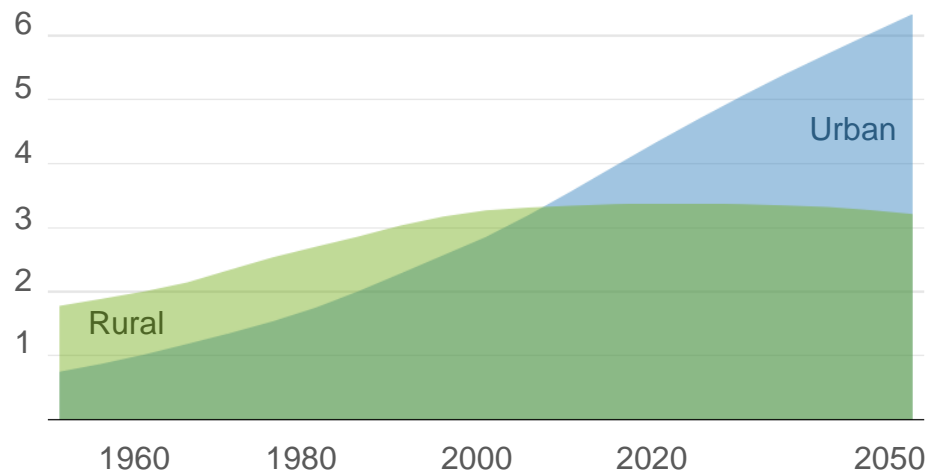
7.6%

85% of the global population lives in urban areas

1.5m people are added to the urban population every week

Accelerating urbanization is one of the 5 global megatrends shaping our world creating new challenges for urban development and resilience.

Worldwide urban and rural population (billions)

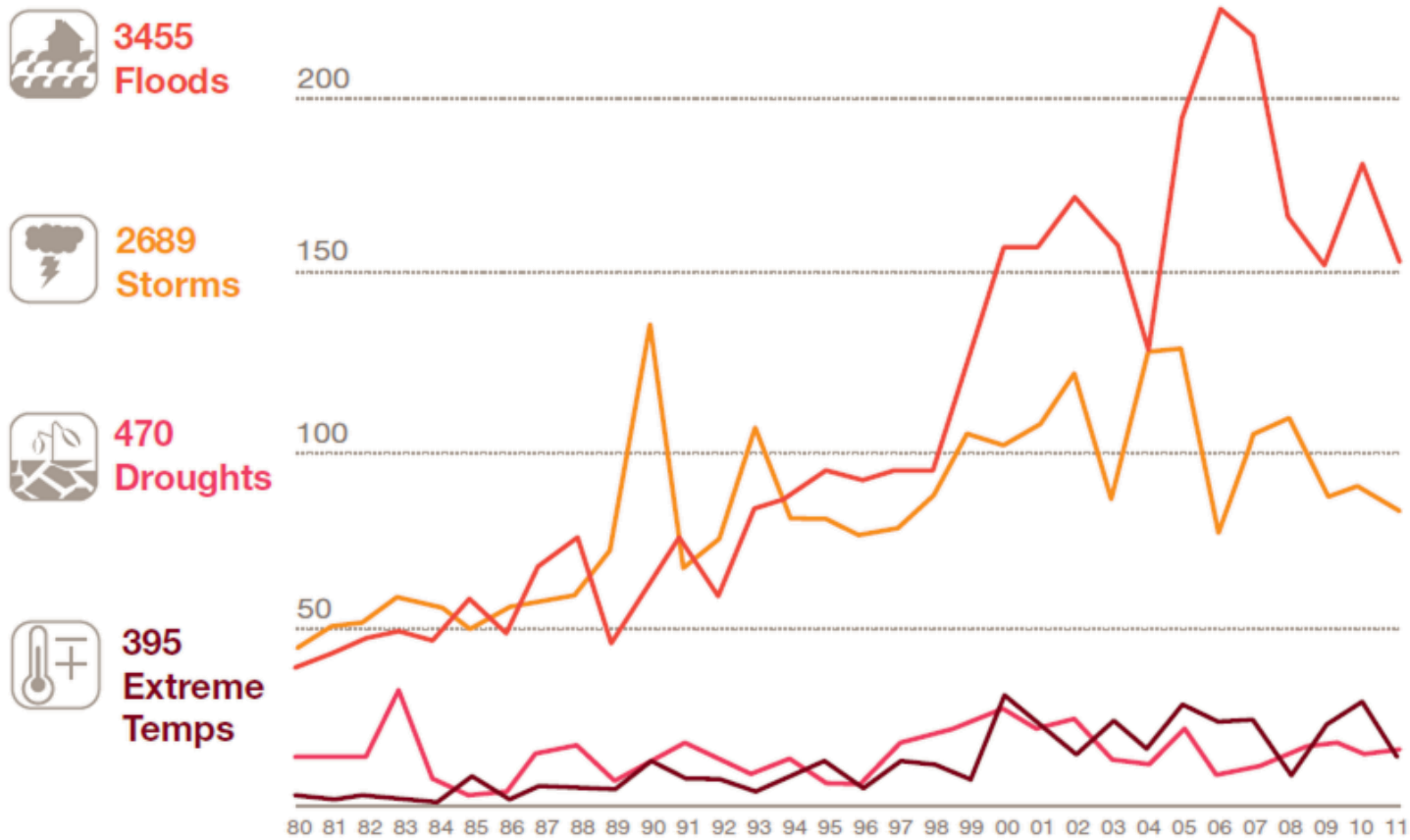


Urban resilience is one of the key factors influencing economic growth



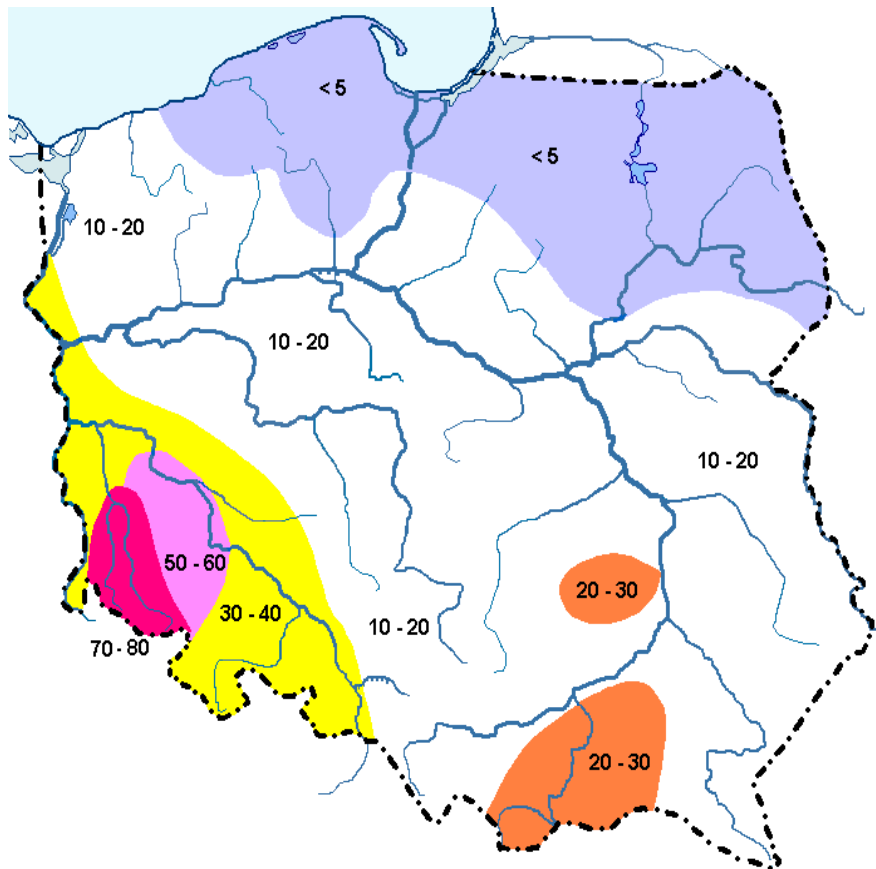
Today, we will talk about one of the key urban resilience challenges: floods

Number of climate-related disasters worldwide (1980-2011)

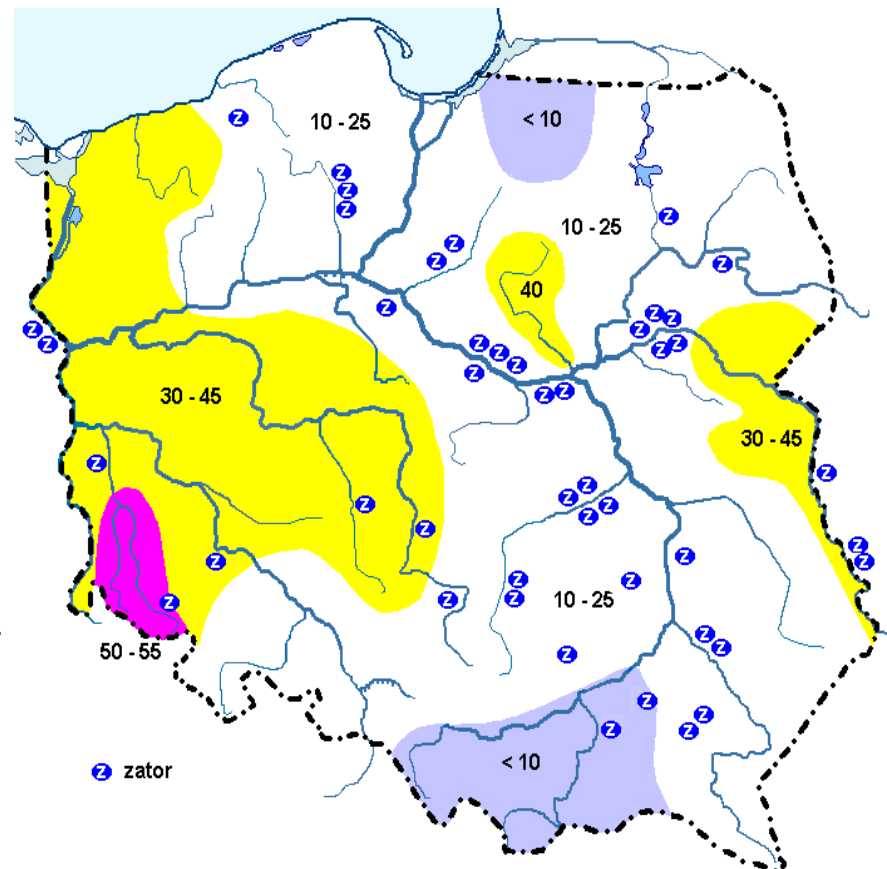


Source: UNISDR
PwC

Floods in Poland 1945-2005



Precipitation based



Winter floods

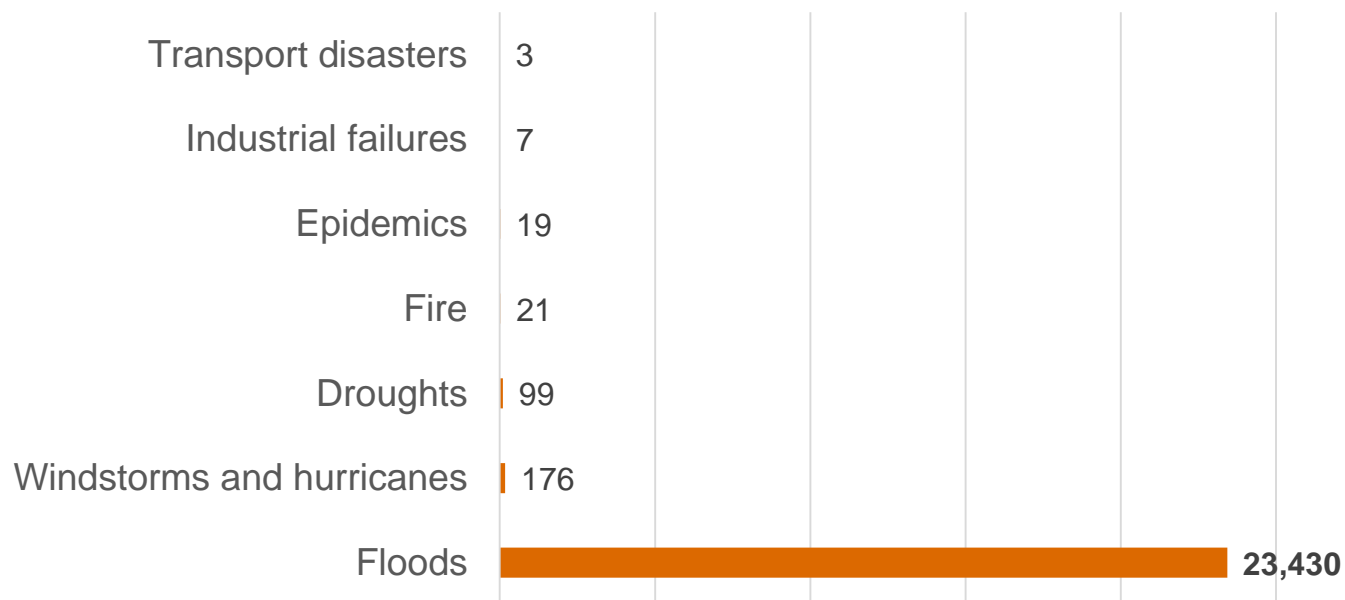
Flood losses in Poland 1990-2010

23 430 Million PLN

1 270 Million PLN per year

98,5% of all natural disaster losses

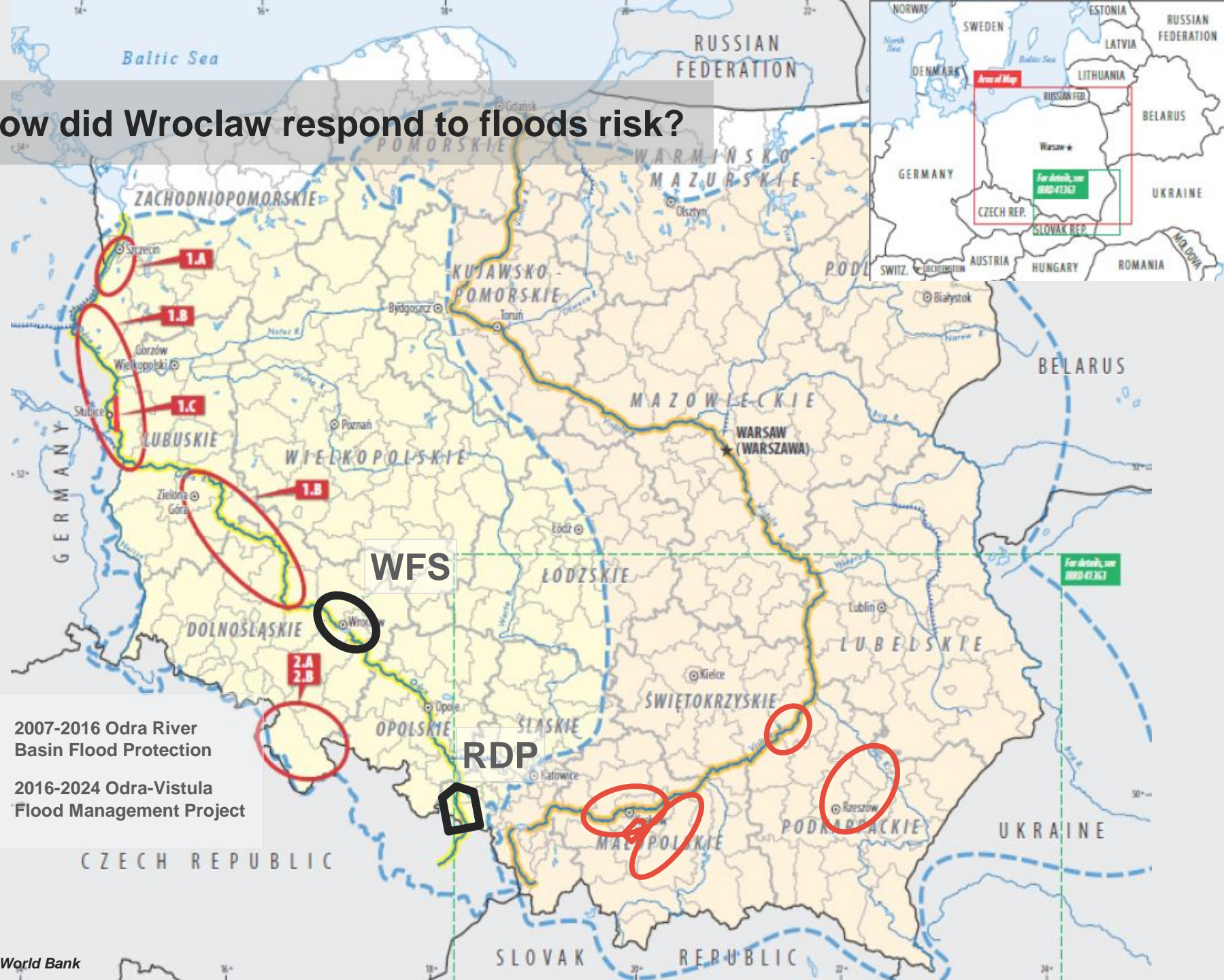
Value of losses caused by natural disasters (PLN th)



Source: RCB

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How did Wroclaw respond to floods risk?



Flood risk is one of the key resilience challenges for Wrocław

6

rivers going
through the city

>100

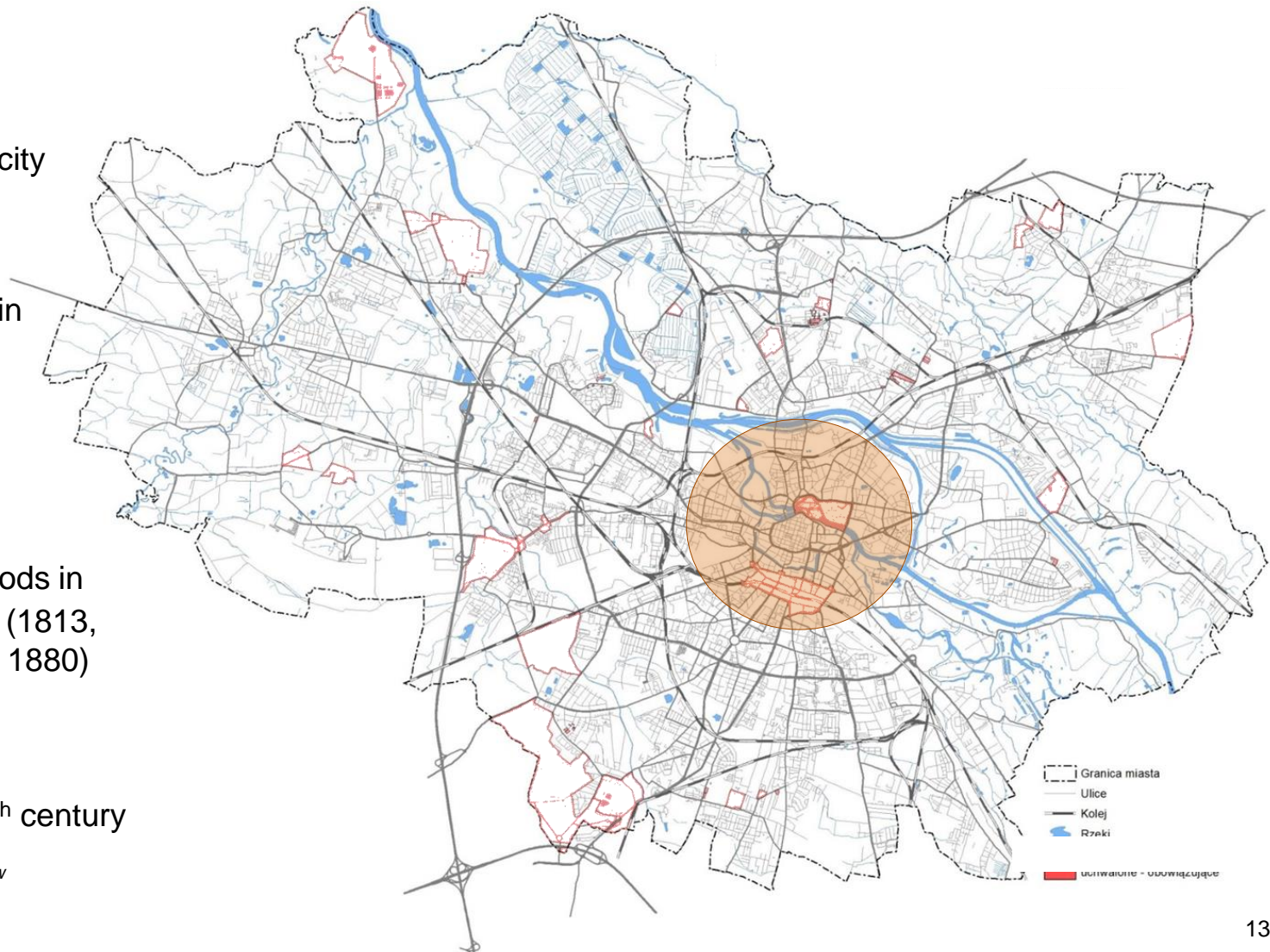
bridges within
the city
borders

4

major floods in
19th century (1813,
1829, 1854, 1880)

12

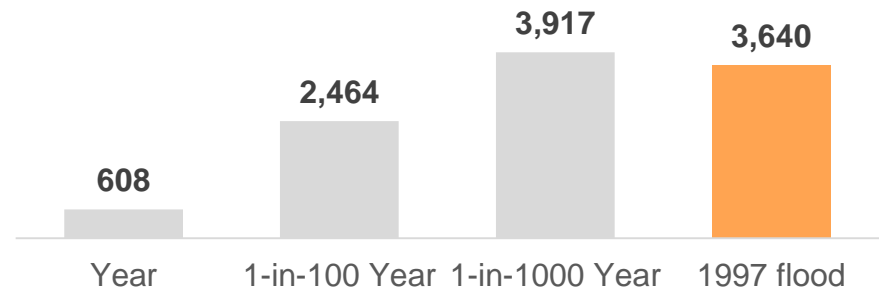
floods in 20th century



Which unfortunately has materialized with harsh negative consequences for the city, its inhabitants and businesses

Then, in 1997, disaster happened.
By far the largest flood caused by heavy rain (rainfall was four times that of the long-term average).

High water discharge rates along Odra - at Wroclaw



Source: World Bank

The flood of July 1997 exposed the weakness of the flood protection system, which was about 100 years old and was developed after the 1903 floods. The protection system could not withstand the flood, and as a result major urban centers were flooded for extended periods.

Similarly, the flood forecasting, monitoring, and warning systems performed poorly. The monitoring systems were damaged early, and the communication systems failed leaving uncoordinated operations of hydraulic structures.

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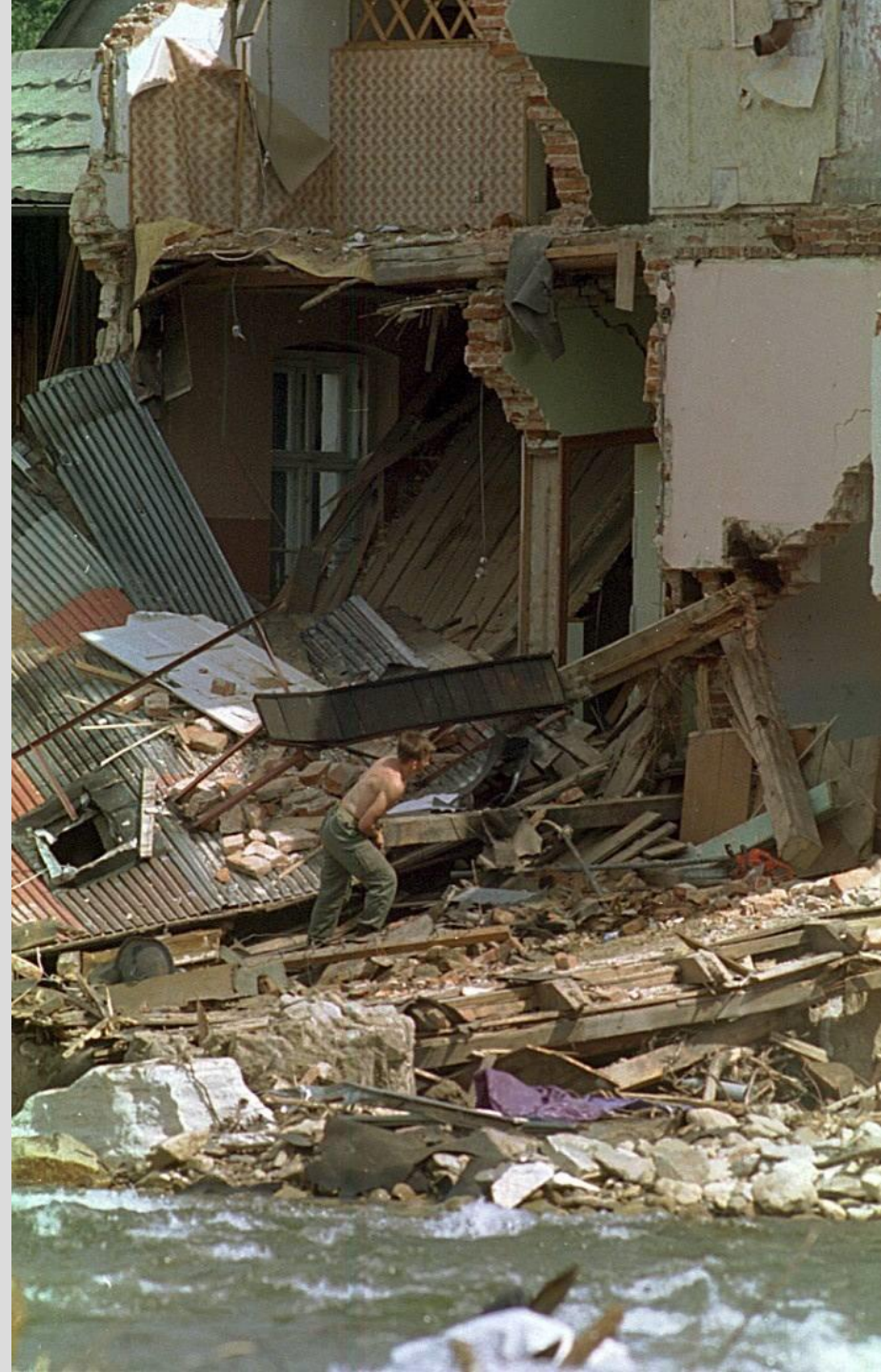
Source: Andrzej Luc



Source: Wojciech Wilczyński, Andrzej Luc



Source: Wojciech Wilczynski, Andrzej Luc





Total damages incurred due to the 1997 flood

Poland

USD 2.3bn (3.7bn in current prices) of loss

Loss of 54 lives

37,000 buildings, 866 bridges, 2,000 km of roads

Wroclaw

USD 192m (304m in current prices, **99.2% of the city budget at the time**)

31% of city area inundated



Wroclaw response to flood risk



Source of the photograph: City of Wroclaw

Flood Protection Projects in Poland supported by World Bank

- 1. Flood Recovery Project 1997 – 2005 (Flood Warning & Monitoring System)**
- 2. Odra River Basin Flood Protection Project 2006 – 2020**
- 3. Odra - Vistula Flood Management Project 2015 – 2022**

Project addressed flood risk in a comprehensive way

		USD million	
A	Raciborz Dry Polder	287	
B	Wroclaw Floodway System	334	
C	Improving Flood Management, Monitoring & Evaluation and Supervision of EMP and RAP	35	
D	Project Management, Technical Assistance Training	8	
Total 2007 - 2017:		664	Total: 885
Pre 2007:		221	



6



7



8



9



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Economic benefits of flood management system investments are broad...

Saving lives

01

Reduction of
loss to assets,
production
capacity and
distress

02

Creating
conditions
catalysing
economic growth

03

Jobs creation

04

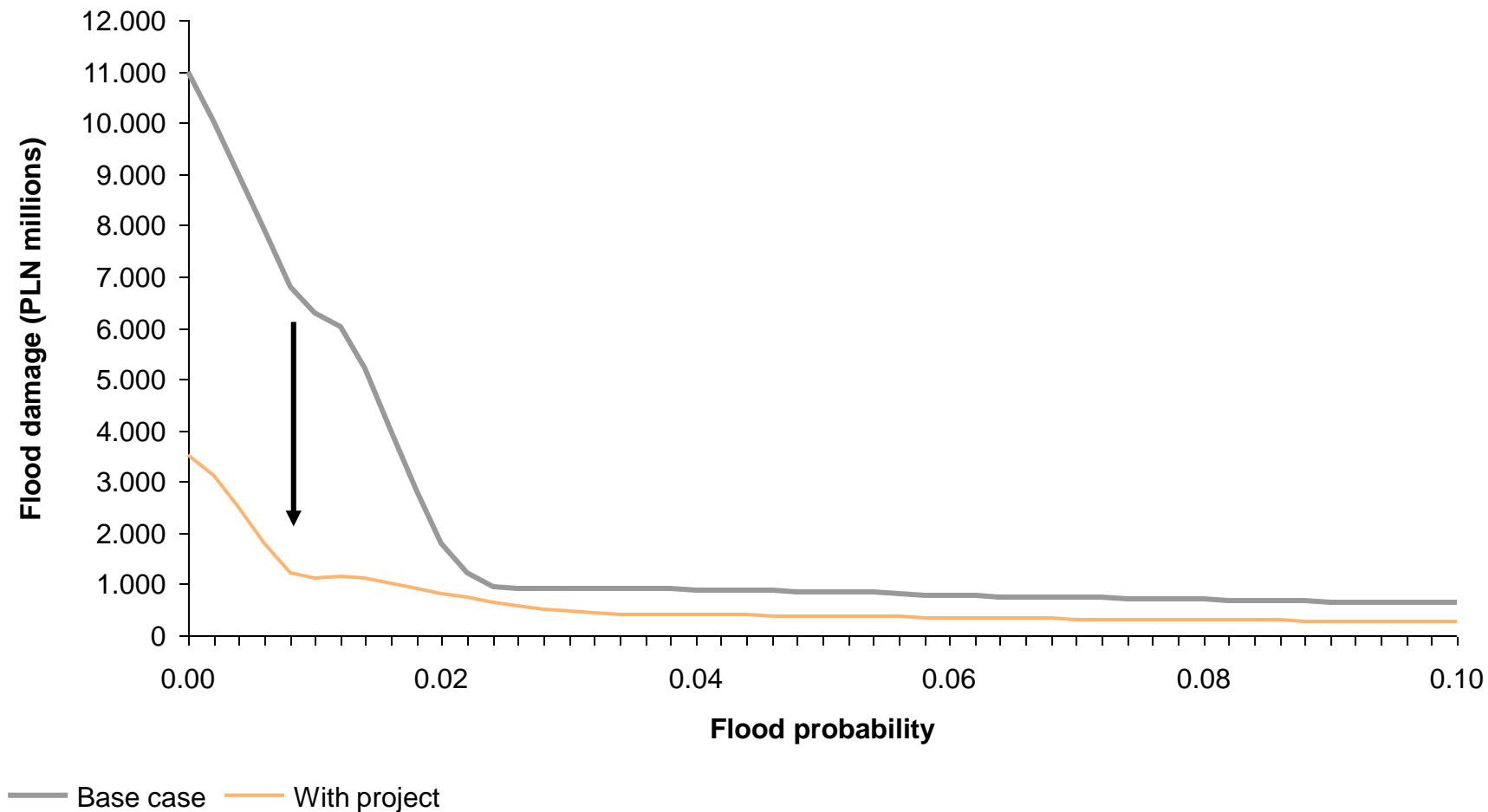
Unlocking
land and
property
potential

05

Reducing
incidence
of poverty

06

... and tangible



Project's Economic Rate of Return is robust with very limited sensitivity to key variables changes

Indicators	ERR (%)
Base case	17.4
Switching Value	
Capital Costs	+200% 10.0
Total Benefit	-50% 10.0
Sensitivity Analysis	
No Real Economic Growth	15.6
Reduction in benefits in accordance with conventional flood probabilities	11.4
10% increase in construction costs	16.5
10% decrease in benefits	16.1
Primary benefits only	16.4
Reduced Raciborz Resettlement Costs	18.4

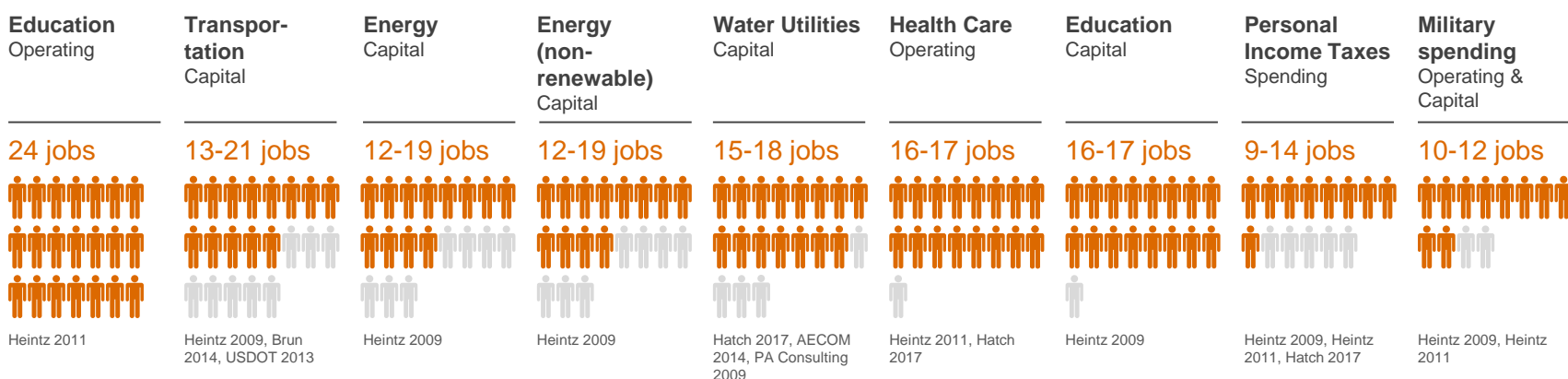
Note: The primary benefits of the Project are the reduction in damages due to recurrent floods

Source: World Bank

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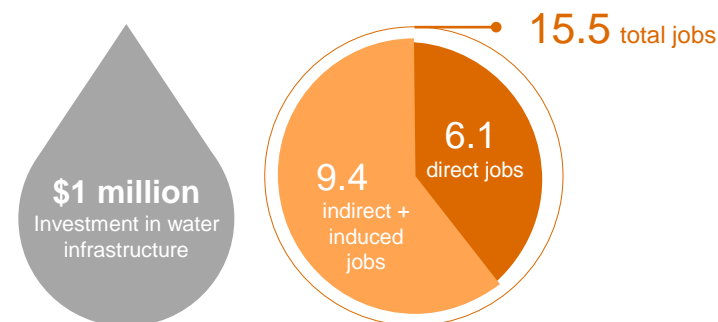
Investments in infrastructure resilience support job creation and economic growth

Jobs per USD 1 million by sector by expenditure type



Economic benefits of water and wastewater service reliability

Impacts to Business	Savings per day of avoided service disruption	
	Aggregate National	Per employee
Sales saved	USD 43.5bn per day	USD 230 per day
GDP saved	USD 22.5bn per day	USD 120 per day
Days to 1% GDP savings	8 days: 1.9m jobs protected	



Note: Values expressed in 2016 dollars. Source: IMPLAN 2015, FEMA 2011, Aubuchon 2012, Chang 2002

Source: The Economic Benefits of Investing in Water Infrastructure, Value of Water Campaign, 2017

How did Wroclaw leverage on investments in urban resilience?



Source of the photograph: City of Wroclaw

Wroclaw flourished over last 20 years becoming one of the key business, cultural and social centers in Central Europe

**The best Mid-sized European
City Of The Future 2016/2017
- FDI Strategy -**

**International EXPO
Exhibition 2012**

**European Football
Championship UEFA
EURO 2012**

**3rd best Mid-sized European
City Of The Future 2016/2017
- Business Friendliness -**

**European Capital
of Culture 2016**

**European Green
Capital**



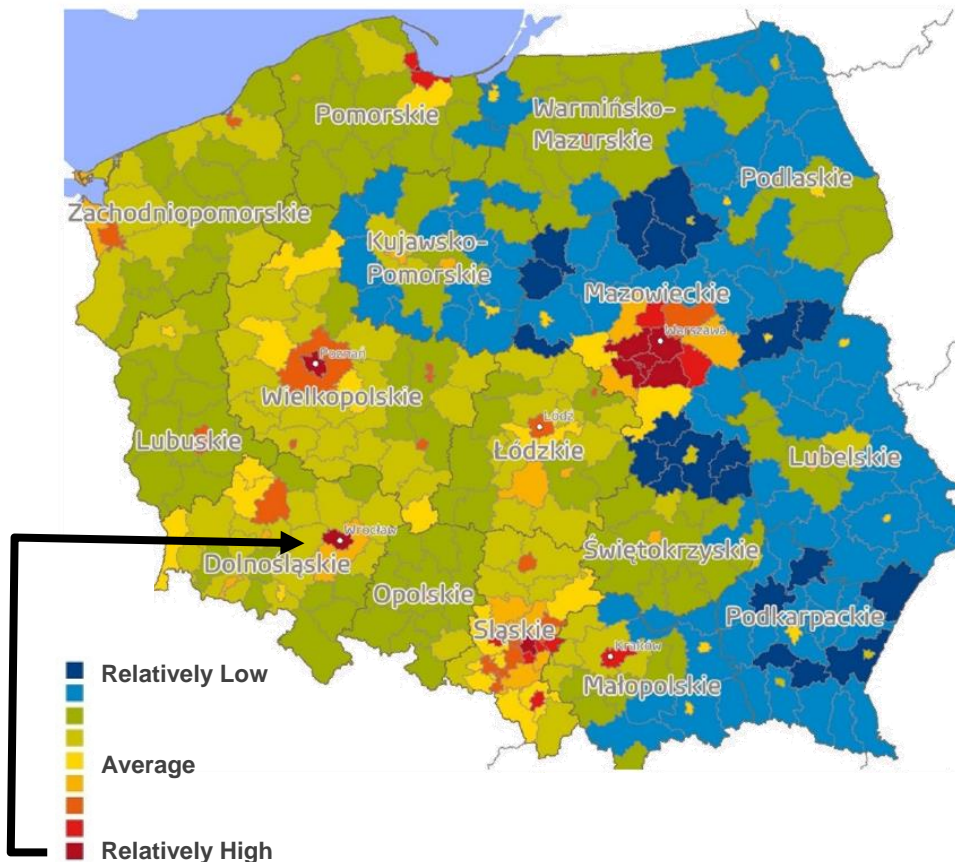
**European Best
Destination 2018**

**The World Games
2017**

**2nd best developed
city in Poland over
past 10 years**

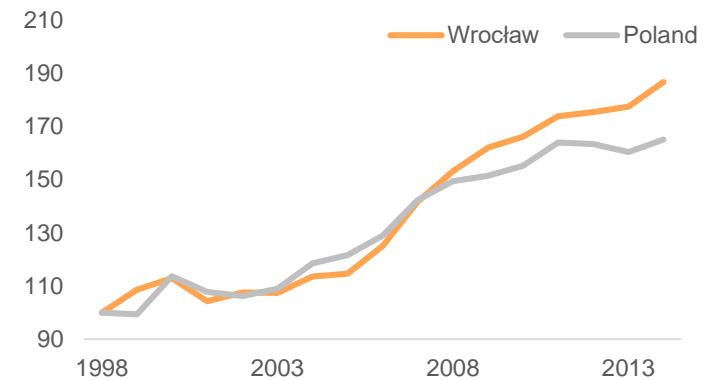
Wroclaw managed to almost double GDP per capita and decrease unemployment to around 2% becoming one of the most prosperous regions in the country

Citizens' purchasing power (2016)



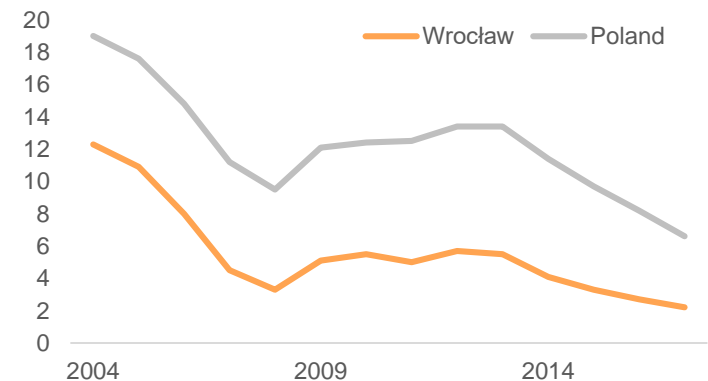
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GDP per capita (real growth rate: 1997: 100)



Source: own calculations based on GUS

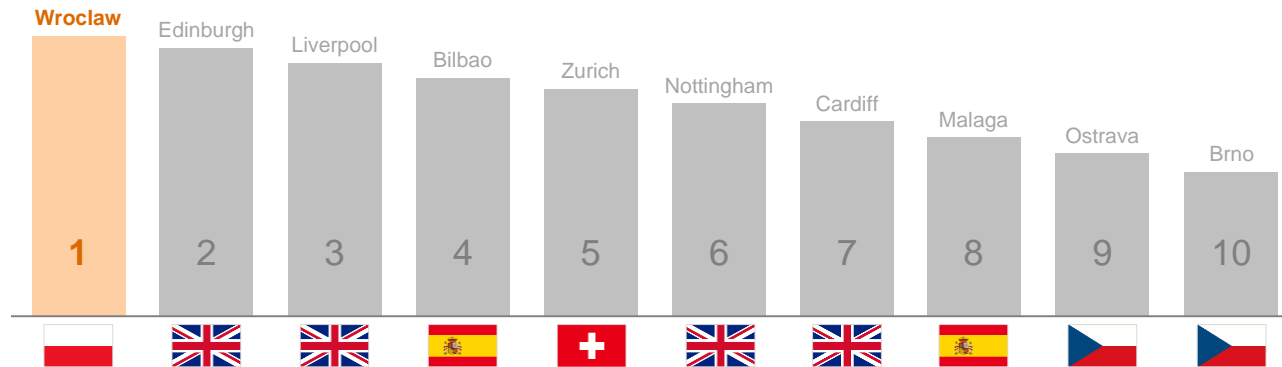
Unemployment rate (%)



Source: GUS

It was mainly an effect of creating enabling environment for businesses to grow, which was noticed by investors

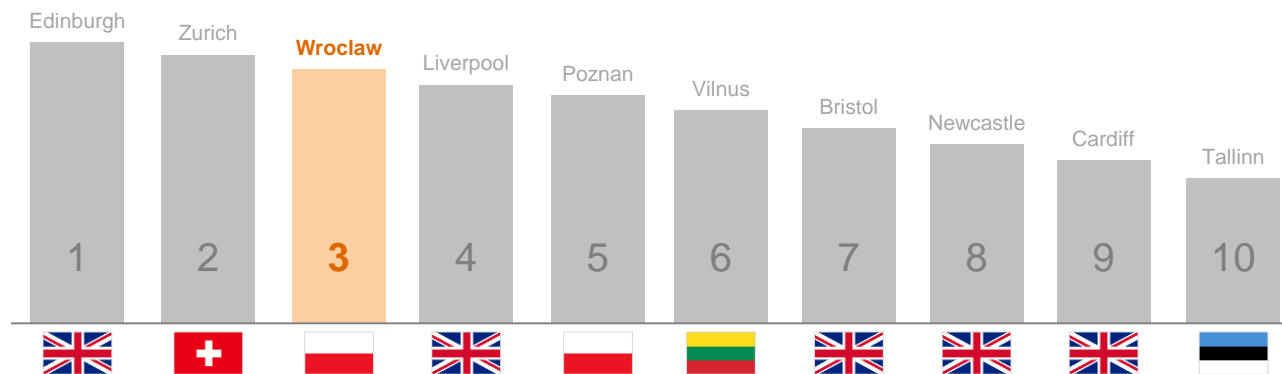
Top 10 Mid-sized European Cities Of The Future 2016/2017 – FDI Strategy



#1 in Investment Attracting Ranking



Top 10 Mid-sized European Cities Of The Future 2016/2017 – Business Friendliness



#3 in the “Business friendliness” category

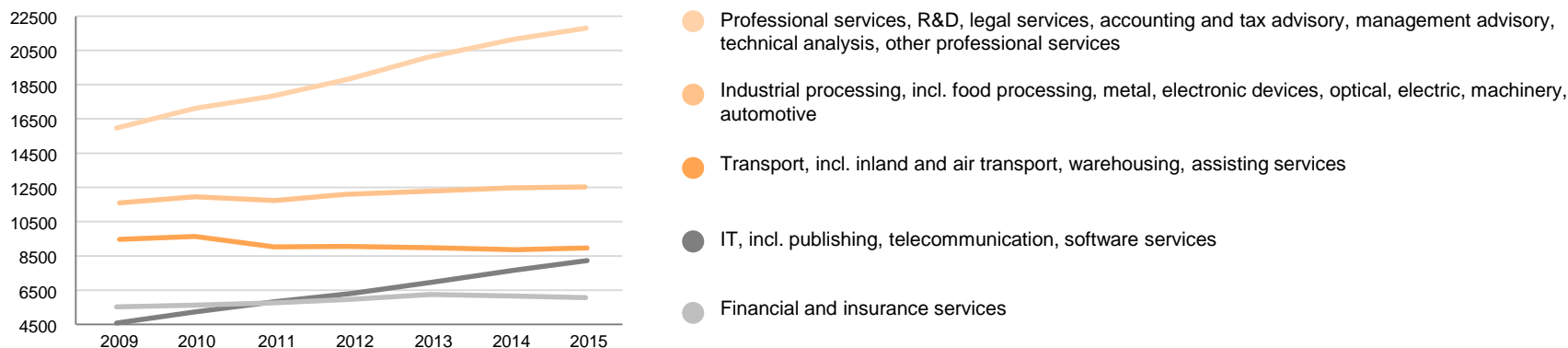


Resulting in solid interest from investors many of which decided to settle in Wroclaw (1/2)

	Production	Services	R&D
until 2005	Macopharma, Robert Bosch, Cargill, Wago Elwag, Autoliv, Clarena, Colgate Palmolive, Clinico, Sitech, Toya, Schumacher Packaging, 3M, SCA, Volvo, Wabco, Hirsch Porozell, Whirlpool, Remy International, LG Electronics, Wago Elwag, Bombardier, Fagor, LG Philips LCD, De Lavel, Heesung, LG Chem, LG Innotek	SmtSoftware, Impel, Kruk SA, Volvo, Central Europe BPO, HP	Neurosoft, Siemens, Techland, Capgemini, Wabco, BenQ
2006	3M, MSI, Eto Magnetic, Faurecia, Toshiba, Electrolux (Żarów, Świdnica)	KPIT Cummins, UPS, GE Money Bank, CSS, Objectivity, ACN, Hicron	Diehl Controls, Fagor, Opera Software
2007	Itumi/Incom, UPM Raflatac, ITT Corporation, Wienerberger, Proton Finishing, SKC	Credit Suisse, PNC Global Services, Google	Whirlpool, REC Global
2008	Volvo, Linde Gaz, Cargill, Amesbury, Sauer Danfoss, HSV, Colgate, Electrolux (Oława)	Wipro, HP, Irevna	Volvo, QAD, Tieto (Tieto Enator), CBR Novasome (Hasco-Lek)
2009	3M, Sonoco, Autoliv, TPV, Electronics, Deerfos, FagorMastercook, Cadbury	Vsplex (grupa Acer), QNH, IBM, McKinsey, UPS, DHL/TKMaxx, Geoban	Nokia Siemens Networks, Capgemini, Opera Software, Apeiron Synthesis, Stem Cell Spin
2010	Pittsburgh Glass Works, Autoliv	Mphasis	Microsoft, Hamilton Sundstrand, Selena Labs, ESPOTEL
2011	3M, LG Electronics, Whirlpool, Chung Hong, Chassis Brakes, Sumika Ceramics	Credit Suisse	3M, Minetronics
2012	Sumitomo Chemical, Bama Companies, Walki, Boart Longyear, Lear Corporation, BASF, Foundation Brakes, Wabco	BNY Mellon, UPS, Qatar Airways, Becton, Dickinson and Company, Qiagen, Atos, Credit Suisse, Koelner	Dolby Laboratories, Luxoft, Nokia Siemens Networks, Infusion, Unit4
2013	ID Technology, Nestle Purina, Wabco	Amazon , Acturis, Birlasoft, BNY Mellon, Merck, Parker Hannifin, Redknee, Synexus	PPG, Nokia Solutions and Networks, Viessmann, Autoliv, Sitech
2014	Sato, Gestamp, Bombardier, Compal	3M, Axiom Law, Fresenius Kabi, Gorilla Group, Cogniance, SoftServe, Medserv	UTC Aerospace Systems, TelForceOne, Robert Bosch, UNIT4
2015	Wago Elwag, Paradigm Precision, AB, GKN, BSH, Schweiker, Nestle Purina	UBS, Red Embedded, Atos, Luxoft, Ocado, Toyota, EY	Electrolux, Whirlpool, Mondelez, Ryanair, Global Logic, Capgemini

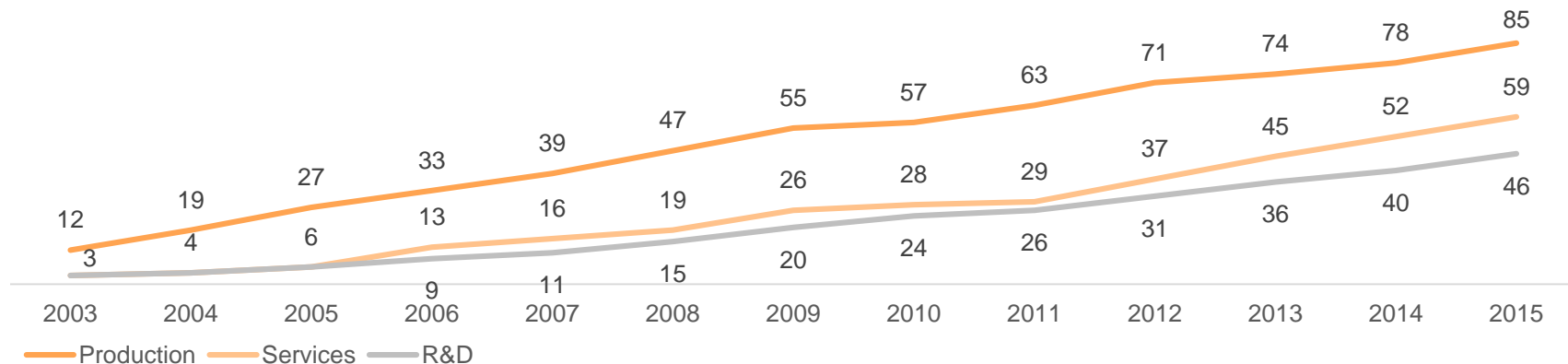
Resulting in solid interest from investors many of which decided to settle in Wroclaw (2/2)

Number of enterprises by sectors, 2009–2015



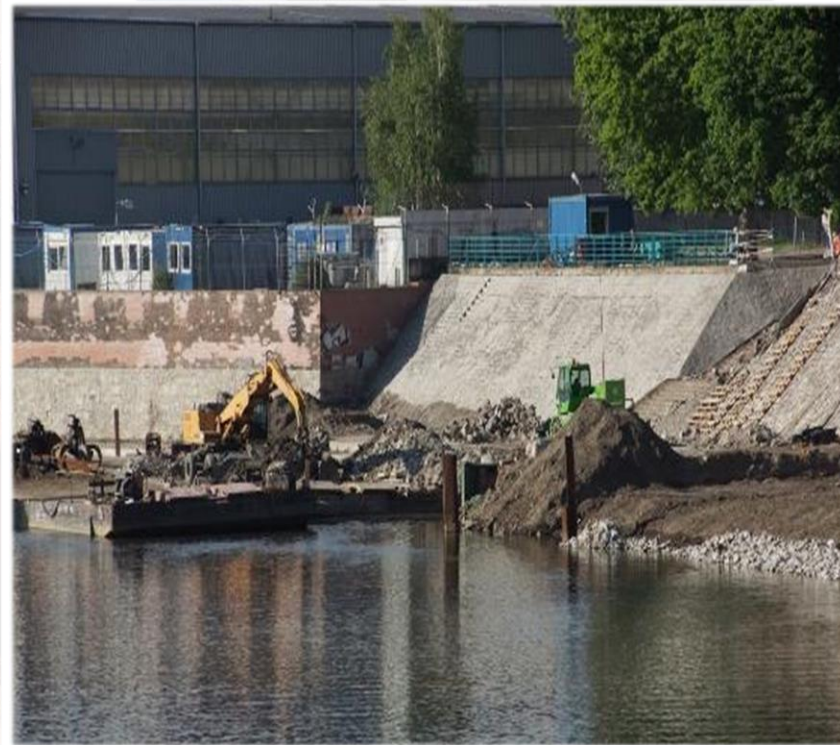
Source: GUS

Number of significant investments in the Wroclaw agglomeration during 2000–2015 by sectors (cumulative)



Source: ARAW 2015



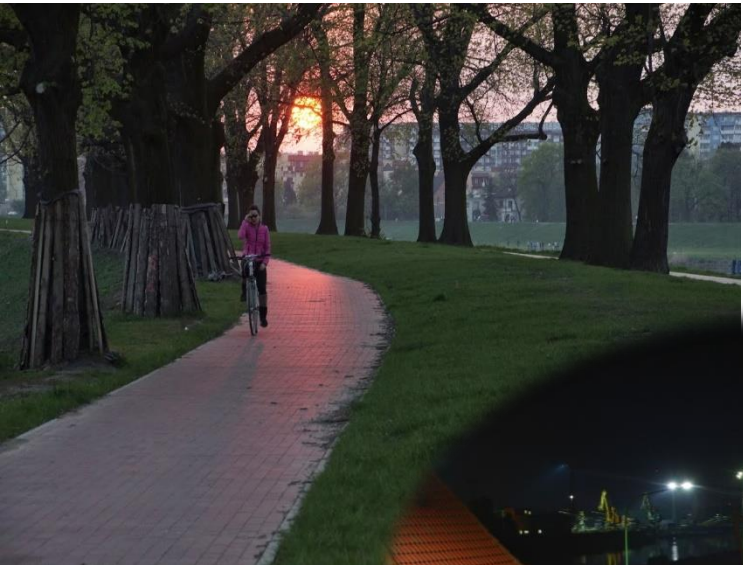












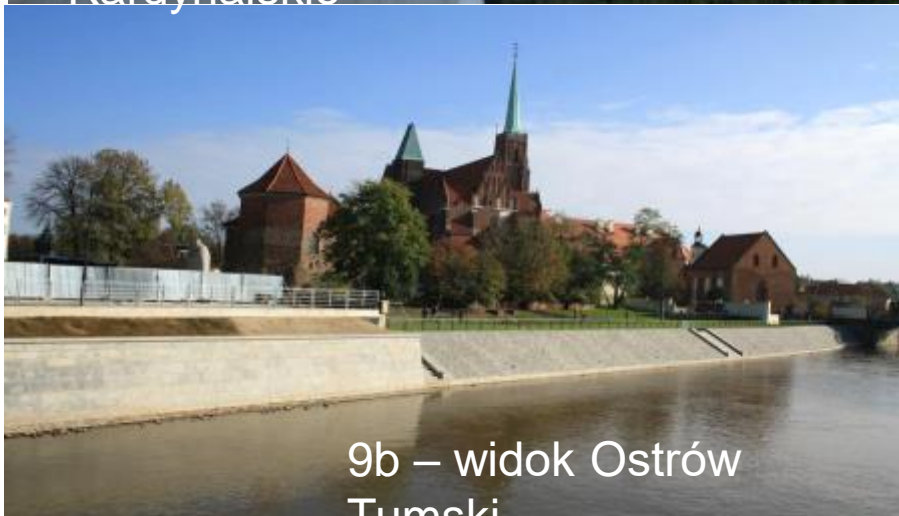


9a – Ogrody
Kardynalskie

2015/08/29



9d – okolice
Elektrociepłowni



9b – widok Ostrów
Tumski



9c – okolice m. Sikorskiego

2015/08/29





Key considerations for project implementation based on ORFPP Project



Source of the photograph: City of Wrocław

Financing structure relied heavily on international financial institutions funding and EU funds (1/2)

		million USD			
ORFPP Component	Cost	WB	EU Fund	CEB	Govern
TOTAL 2007 - 2016:	664	184	171	269	39
		28%	26%	41%	6%
Funding pre 2007:	664				
Funding 2007-2016	221				
TOTAL:	885				

Note:

1. Retroactive financing option on WB facility to cover urgent project preparation and start up needs (up to EUR 10m)

2. Values including VAT

Source: World Bank

Financing structure relied heavily on international financial institutions funding and EU funds (2/2)


		million USD			
ORFPP Component	Cost	WB	EU Fund	CEB	Govern
A. Raciborz Dry Polder	287	93	105	50	39
- Resettlement costs	85	47	-	-	39
- Construction and supervision	202	46	105	50	-
B. Wroclaw Floodway System	334	48	66	219	1
- Resettlement costs	17	-	-	17	1
- Construction and supervision	316	48	66	203	-
C. Improving Flood Management	35	35	-	-	-
D. PM & Technical assistance	8	8	-	-	-
TOTAL 2007 - 2016:	664	184	171	269	39

Note: Values including VAT

Source: World Bank

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Resettlement Action Plan was a critical component of Project execution

Land required for RDP (B): **2,627 ha** 

All land and buildings within this area would have to be acquired by government.

Required relocation:

- 2 villages
- 700 people (260 families, 161 households)
- 20 businesses (i.e. animal farms, gravel mines, mechanics, bakery, shops, bars)
- 22 community assets (i.e. school, kindergarten, fire brigade buildings, church, cemetery)

2,425 plots to be acquired from private individuals (30% of land area)

176 plots to be acquired from private firms (6% of land area)

73% of plots of size 0 - 0.5 ha

88% of plots of size 0 - 1 ha

Stakeholder mapping and Communication Strategy form a core of successful RAP (and project execution).

Project management involved coordination of multiple institutions including governmental and local authorities

Unit:	Role:	Superior:
ONDR The Office of Natural Disasters Recovery	Overall responsibility for project management and coordination plus supervision of regional units (DZMiU)	Ministry of Interior and Administration
PSC Project Steering Committee	Established to provide guidance and coordinate project activities at the highest level of Government.	Ministry of Interior and Administration
KZGW The State Water Management Authority	Project implementation through its Regional Authorities: RZGW-GL (Gliwice) and RZGW-WL (Wroclaw)	Ministry of Environment
PCU Project Coordination Unit (in Wroclaw)	Overall coordination and management on day-to-day basis.	KZGW → Ministry of Environment
RZGWs & DZMiU Project Coordination Unit (in Wroclaw)	RZGW-GL: RDP RAP & EMP RZGW-WL and DZMiU: WFS RAP & EMP	KZGW → Ministry of Environment

Key takeaways

Urban resilience is one of the key elements considered by investors. It supports development of enabling environment and stability catalysing economic growth and well-being of a society as a whole.

The benefits from investments enhancing urban resilience include (on top of saved lives): increased safety and stability, avoided losses, disruptions and induced value added.

Setting clear and precise project objectives and executing thorough analysis including evaluation of potential solutions and their implications leading to effective design solutions and project structuring are key for successful projects.

Exquisite understanding of stakeholders environment and efficient communication strategy highly influence execution. Land acquisition and resettlement should be planned and structured prior to project appraisal.

Strong institutional capabilities and experienced and skilled partners are key for successful project delivery.





Thank you