Introduction to Non-revenue Water concepts and definitions

Regional Workshop on "Capacity Development, Water Operators' Partnerships and Financing for Non-revenue Water Management"

7-9 July 2014, Dushanbe, Republic of Tajikistan

WLR: A Key Issue of Water Management

WATER21, June 2008, p. 48

Reducing WLR in low and middle income countries to just half the current level would deliver the following benefits:

- **11 billion m³/a** would be available to water customers
- **130 million people** more could again access public water supply
- water utilities would gain **US$ 4 billion** of self-generated cash flow

UN-U Bonn, September 3rd, 2008

- world population 6.1 billion
- 0.5 billion living in water deficit areas
- 1.2 billion lack access to safe drinking water
- > 50 % living in urban settlements
- > 50 % WL in many towns, mega-cities

45 million m^3 of drinking water are lost in the world's water systems every day!!

- … this quantity could serve nearly **200 million** people
- **1/3** of the water is lost in developing countries
- **20-50%** loss (even more in some cases) of produced water

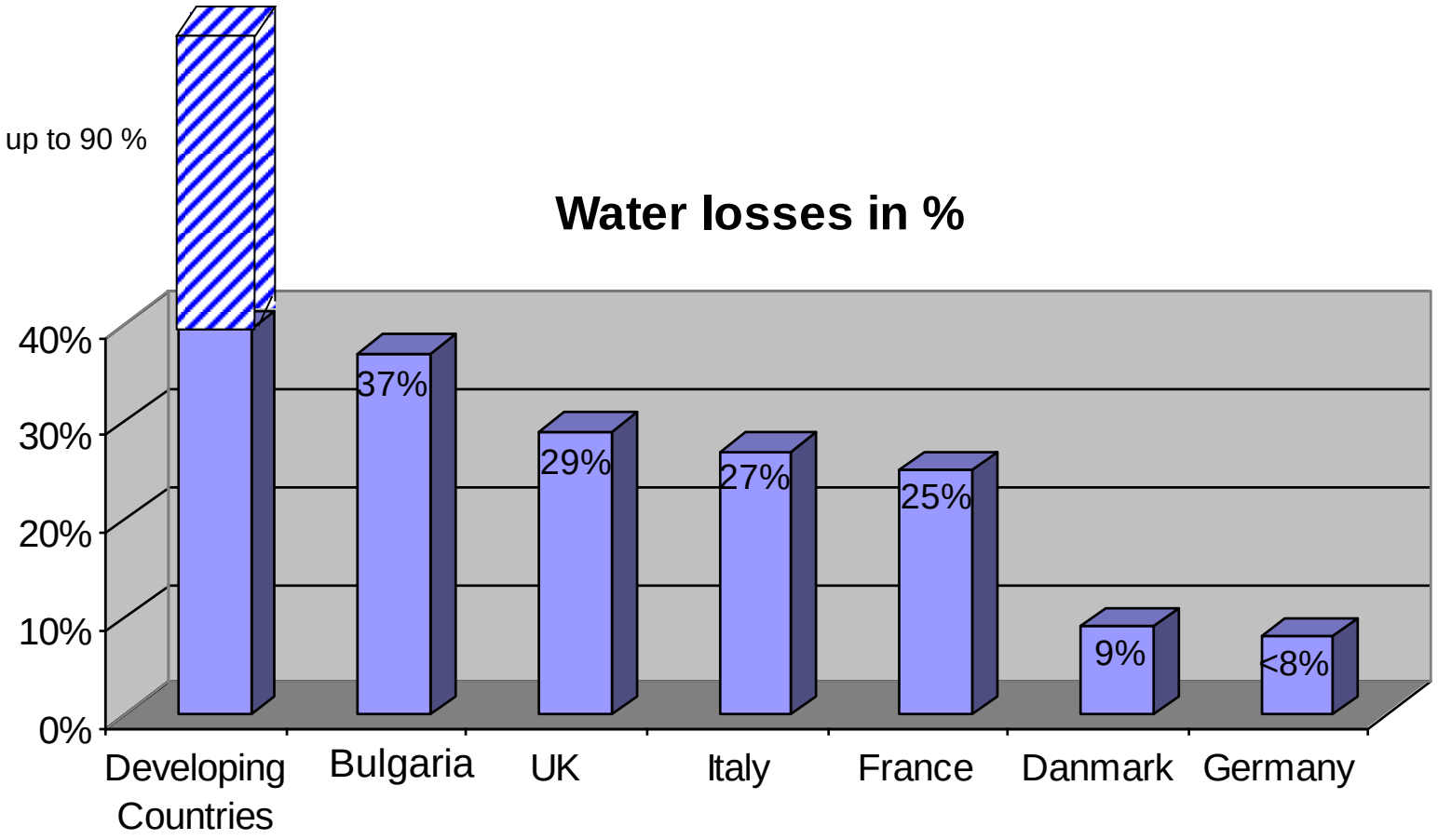
In many of the **21 megacities** (>10 million): **250-500 million m^3** are lost or not paid for…

Scale of the Problem: Global NRW Estimates

	Supplied Urban Population (2002)	System Input [l/c/d]	ESTIMATES OF NRW					
			Level of NRW [% of System Input]	Ratio		Volume, billion m³/year		
				Physical Losses	Com-mercial Losses	Physical Losses	Com-mercial Losses	Total NRW
Developed Countries	745	300	15%	80%	20%	10	2	12
Eurasia (CIS)	178	500	30%	70%	30%	7	3	10
Developing Countries	837 (out of 1,903)	250	35%	60%	40%	16	11	27
Source: **Water Supply and Sanitation Sector Board Discussion Paper Series No.8** **(W. Kingdom, R. Liemberger, P. Marin)**				**TOTAL**		**33**	**16**	**49**

W O

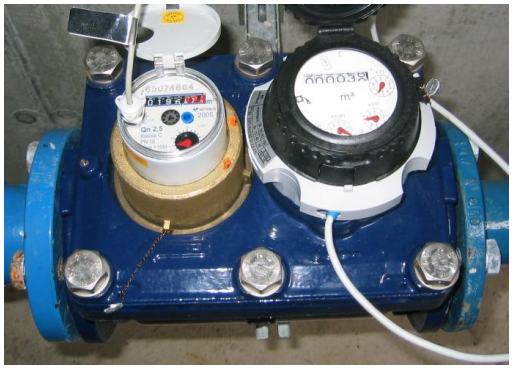
Water Loss Figures from Different Countries

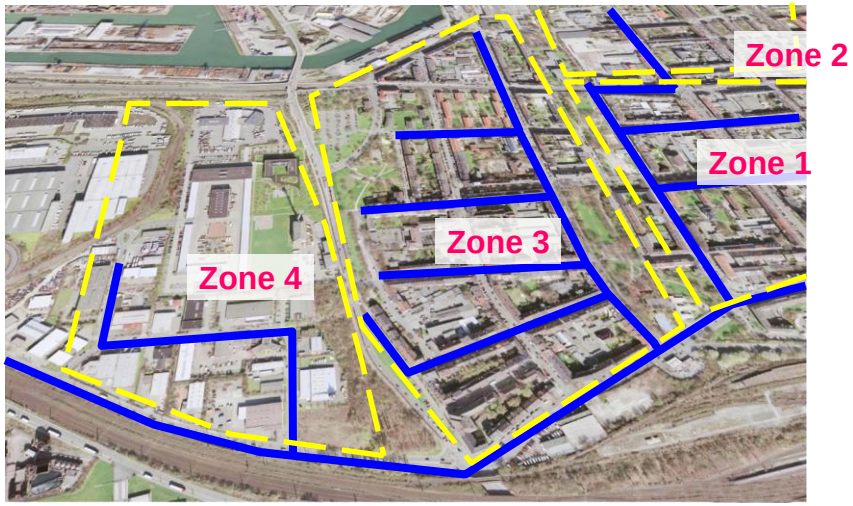


Source: BGW 2004 u.a.

Technical aspects of NRW

- New and low-cost techniques for leak detection, strategies for continuous remote control in monitoring and metering are available
- Wide gap between availability of technologies and management tools for their application
- Benefits by flow metering and pressure measurement (reduction of costs, risk prevention, water saving, longer lifetime, water quality control,…)
- Costs of failures from leaking or collapsing pipe network exceed savings in expenses for structural maintenance and rehabilitation





Times Change,
and so does the (assumed) WL-Optimum!

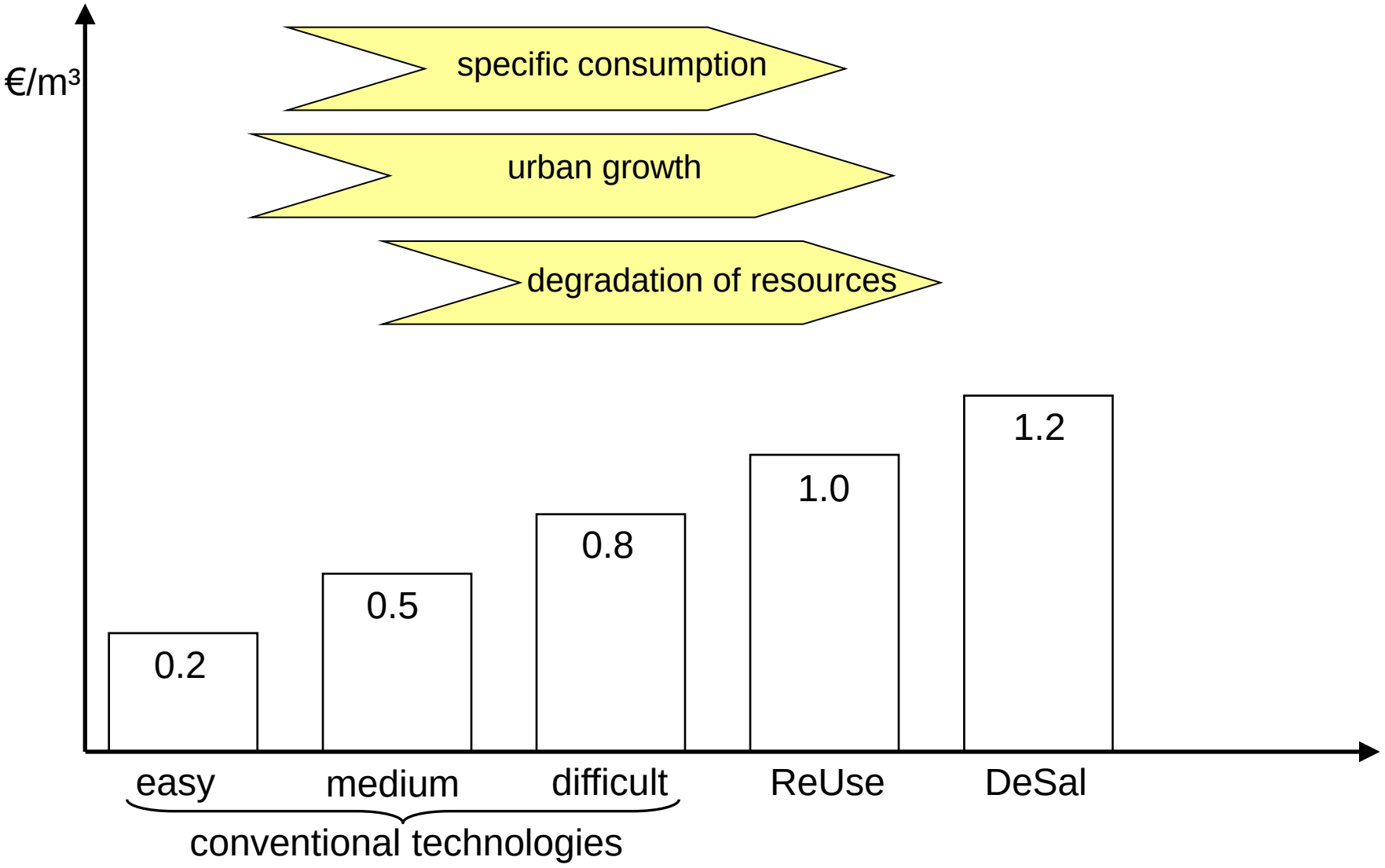
Whereas ± 15 % WL have been assumed the economic "Optimum" during the past decades,
the updated, a present "Optimum“ is significantly lower
(depending on local conditions)

→ because of increased costs for
supplied water (production **+** distribution),
especially power

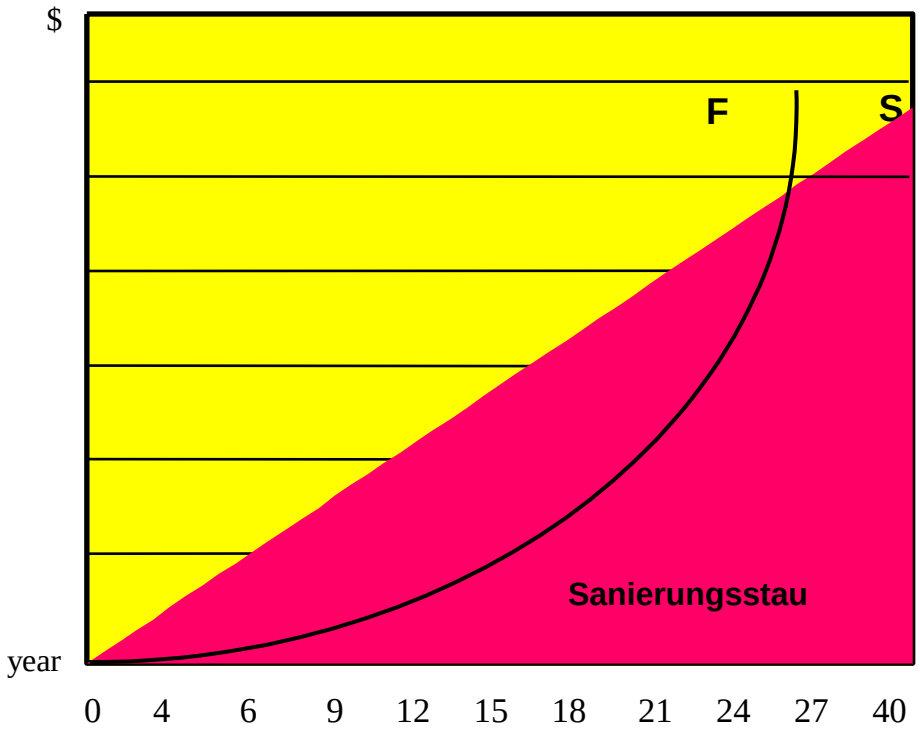
→ because of increased regional shortages
and increased vulnerability to system failures
and surplus damage of WL

→ because of improved technologies for WLR
(leak detection, trenchless rehabilitation, automated metering, asset management etc.)

The Cost Hierarchy of Water Production



Surplus Economical Damage - Technical



Surplus Costs for delayed action:

Accidents, foundation destabilisation, road collapse, wetting of buildings, appliances etc., tree and greenland damage, flooding, diseases, clean up costs, emergency surplus costs, groundwater contamination, and ST surplus,

Spectacular BURST LEAKAGE

Bursts are large, reported fairly quickly and therefore do not leak for long

WLR, rehab in time might have saved money!

Surplus Costs: Reduced Lifetime of Buildings

Surplus Costs: Accidential Damages

Surplus Costs: Erosion

Surplus Costs: Surface Washout plus Accidential Damage

Surplus Economical Damages through WL

ADMINISTRATIVE LOSSES

- excessive consumption Soweto Washing Machine
- illegal water trafficking Cochabamba
- unwillingness to pay / to charge
  Saigon central

⇨financial destabilisation of Water Utilities

➔ non-sustainable water services**!**

Admin Losses: Illegal Connections

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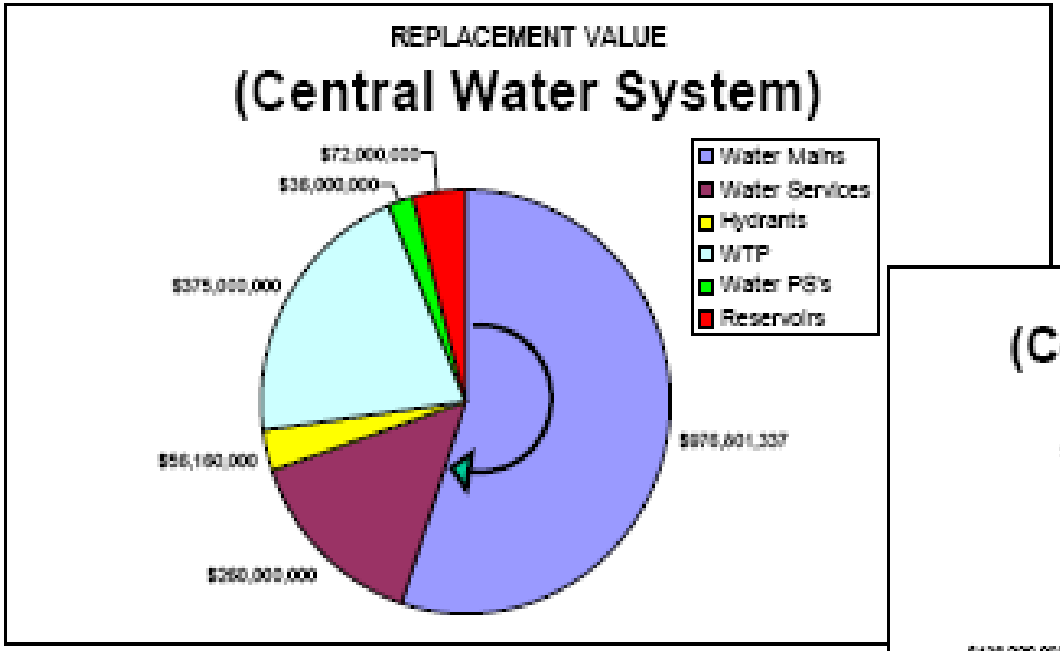
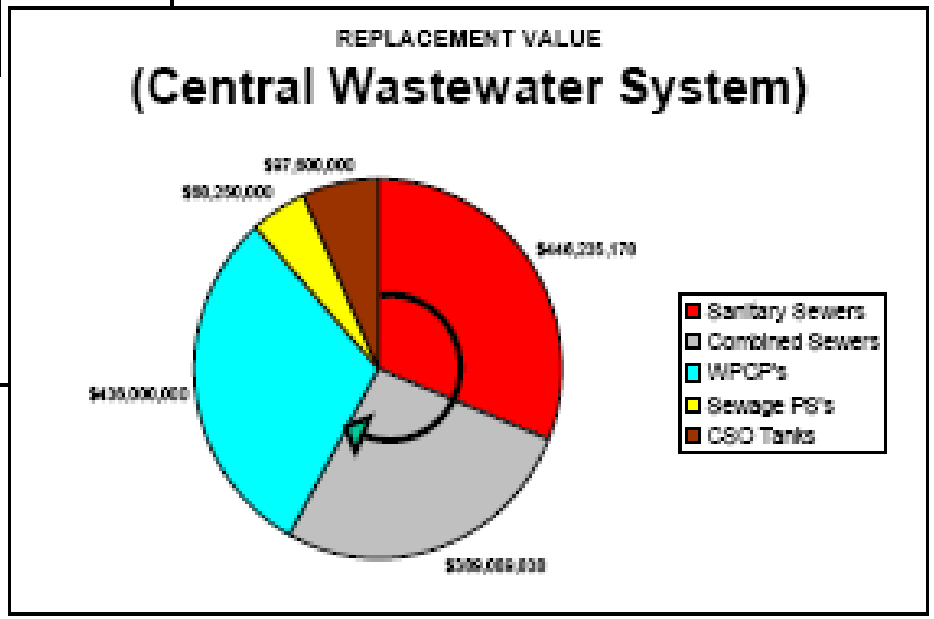
Over 80 % of Pipe Network Invisible to the Public

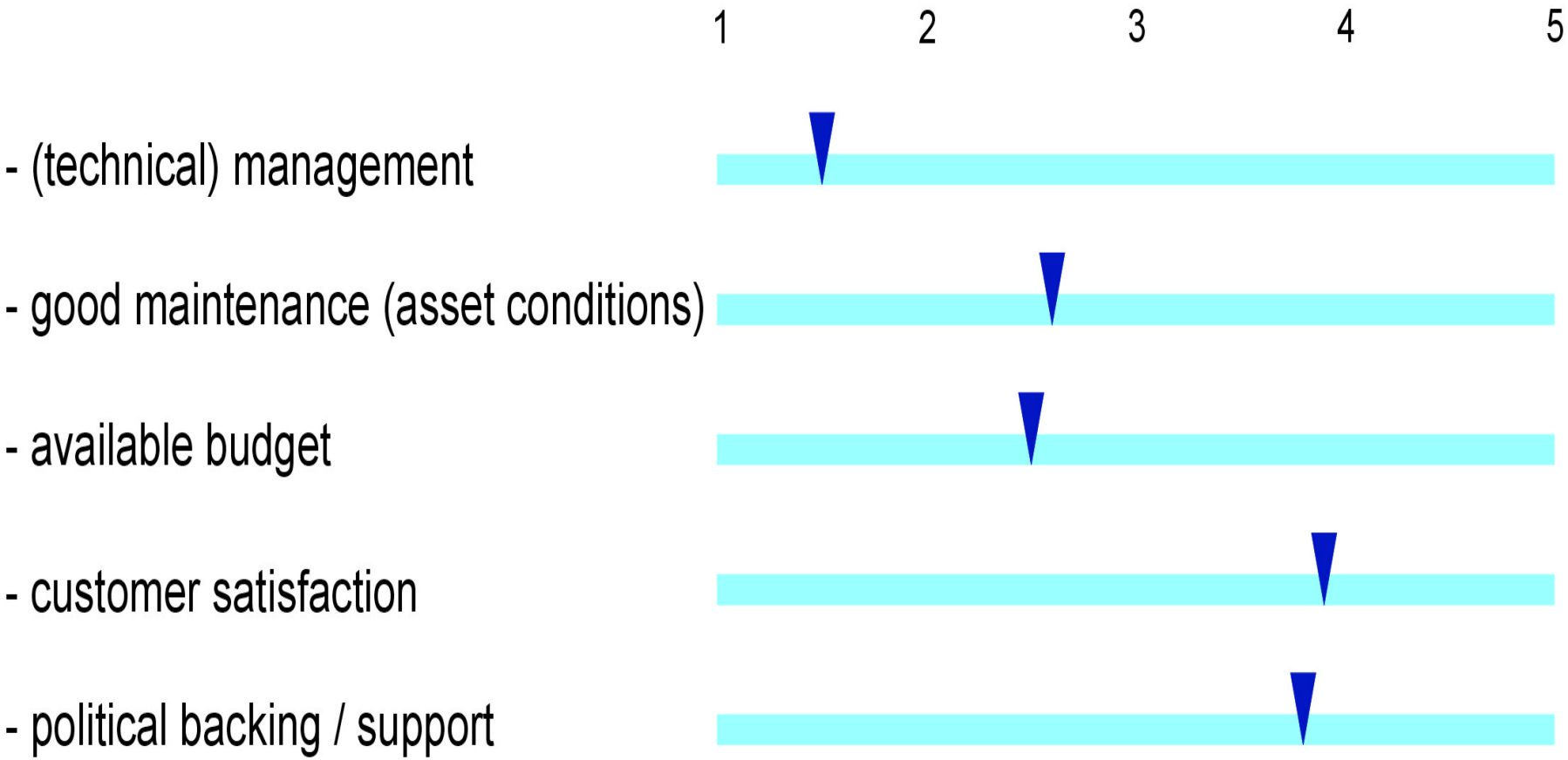




Why WLR is not PR-attractive

- WLR **activities** are either invisible to the public, or disturbing.
- Today's politicians will be made responsible for costs & disturbances of WLR, whereas the benefits are for tomorrow.
- Serious "package **solutions**", for easy handling by the client, are not yet strong on the market.
- **Lobbying powers** are focused rather on large investments (desalinations, dams), than on WLR as business target.

What CEO‘s from Large Water Utilities, responsible for mio 22 customers in 4 regions worldwide, consider as **success factor for water efficiency** between very high (1) and less important (5) [IEEM, survey IV 2009]



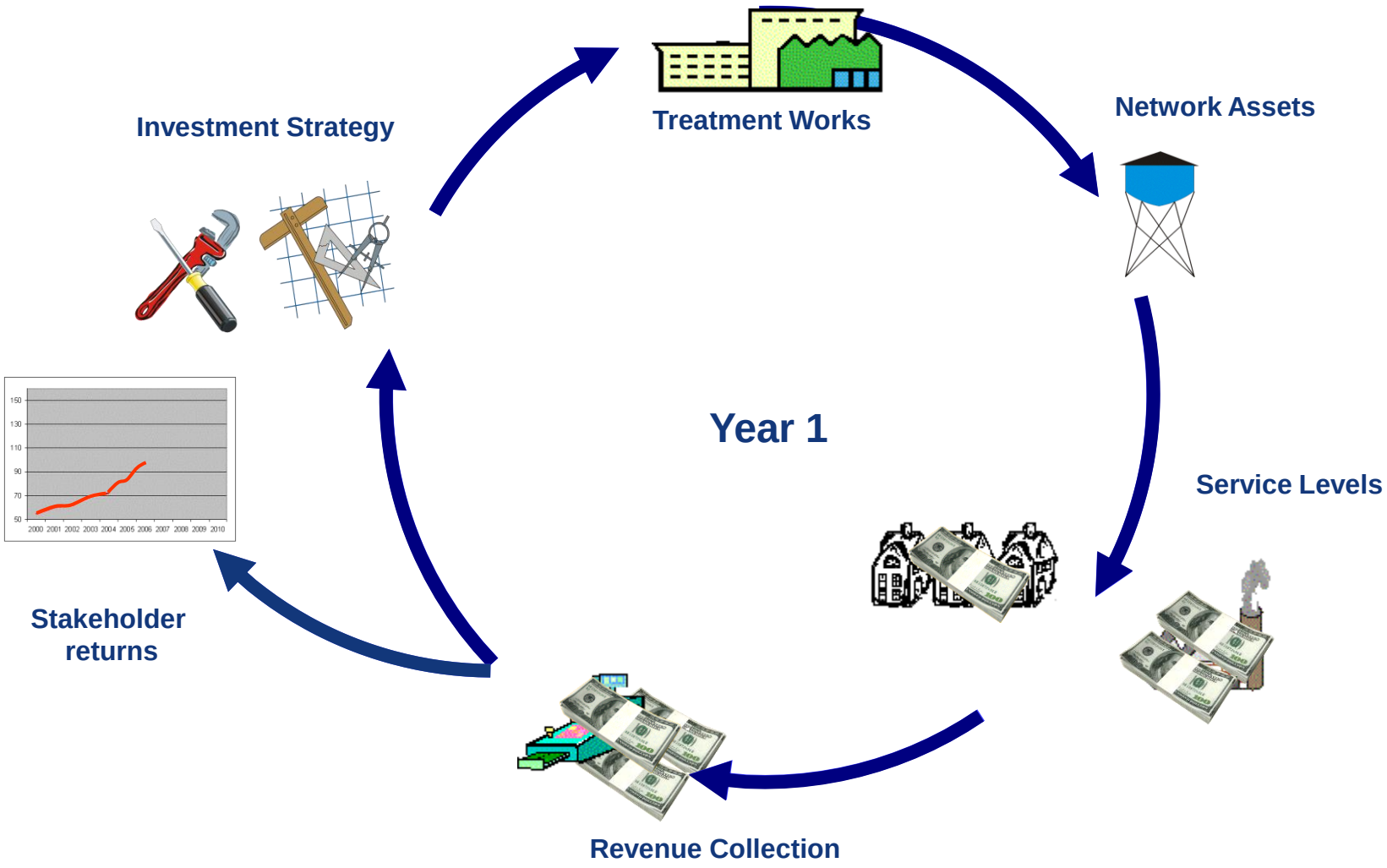
What CEO‘s from Large Water Utilities,
responsible for mio 22 customers in 4 regions worldwide,
consider as **pre-condition for good utility management**
in priority ranking, from lowest (5) to highest (1)
[IEEM, survey IV 2009]

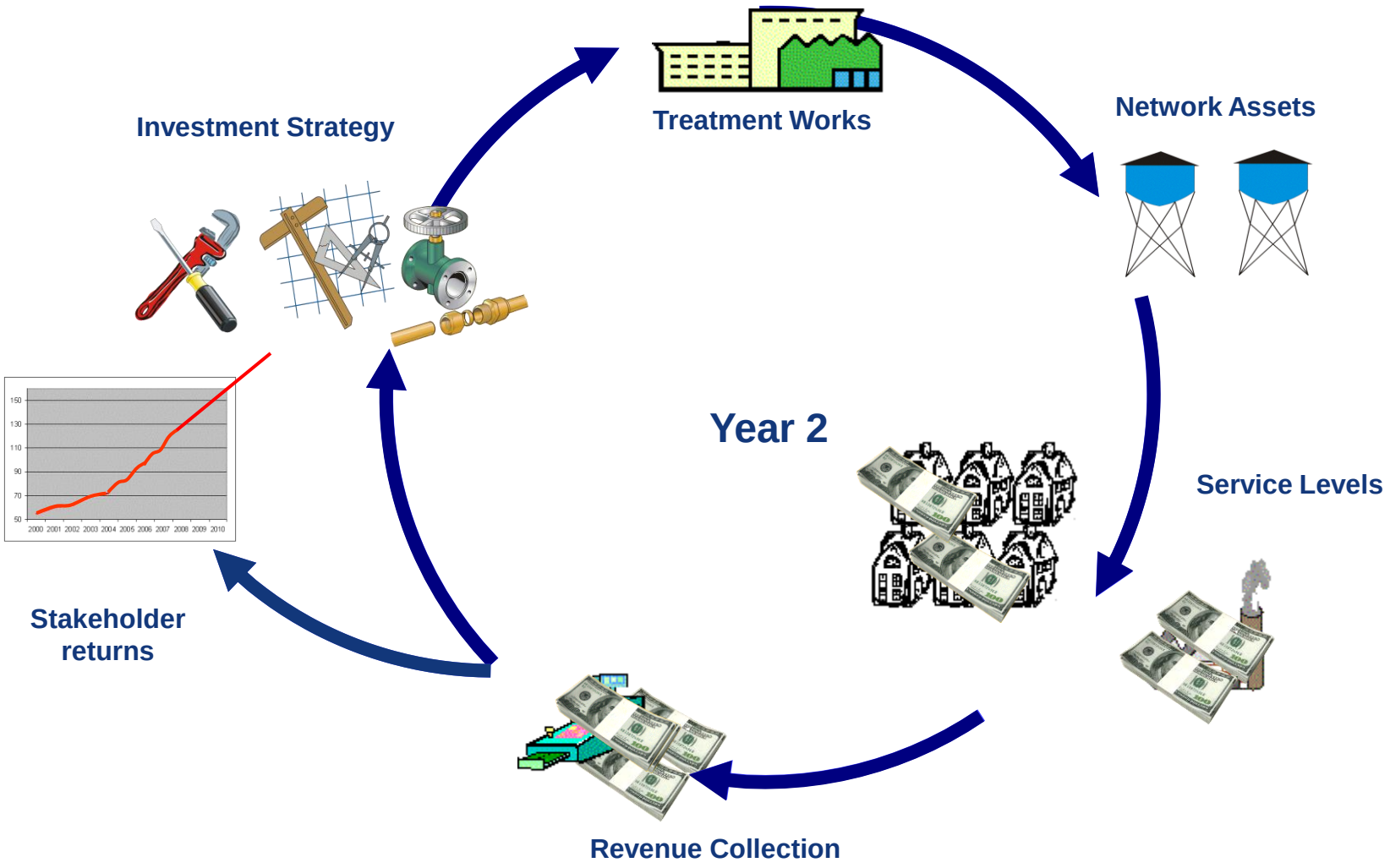
1. Know-How (➔ Capacity Development)
2. Technologies (➔ adapted, appropriate)
4. Political Support (➔ empowered decisions, execution)
5. Budget (➔ must cover necessary activities)

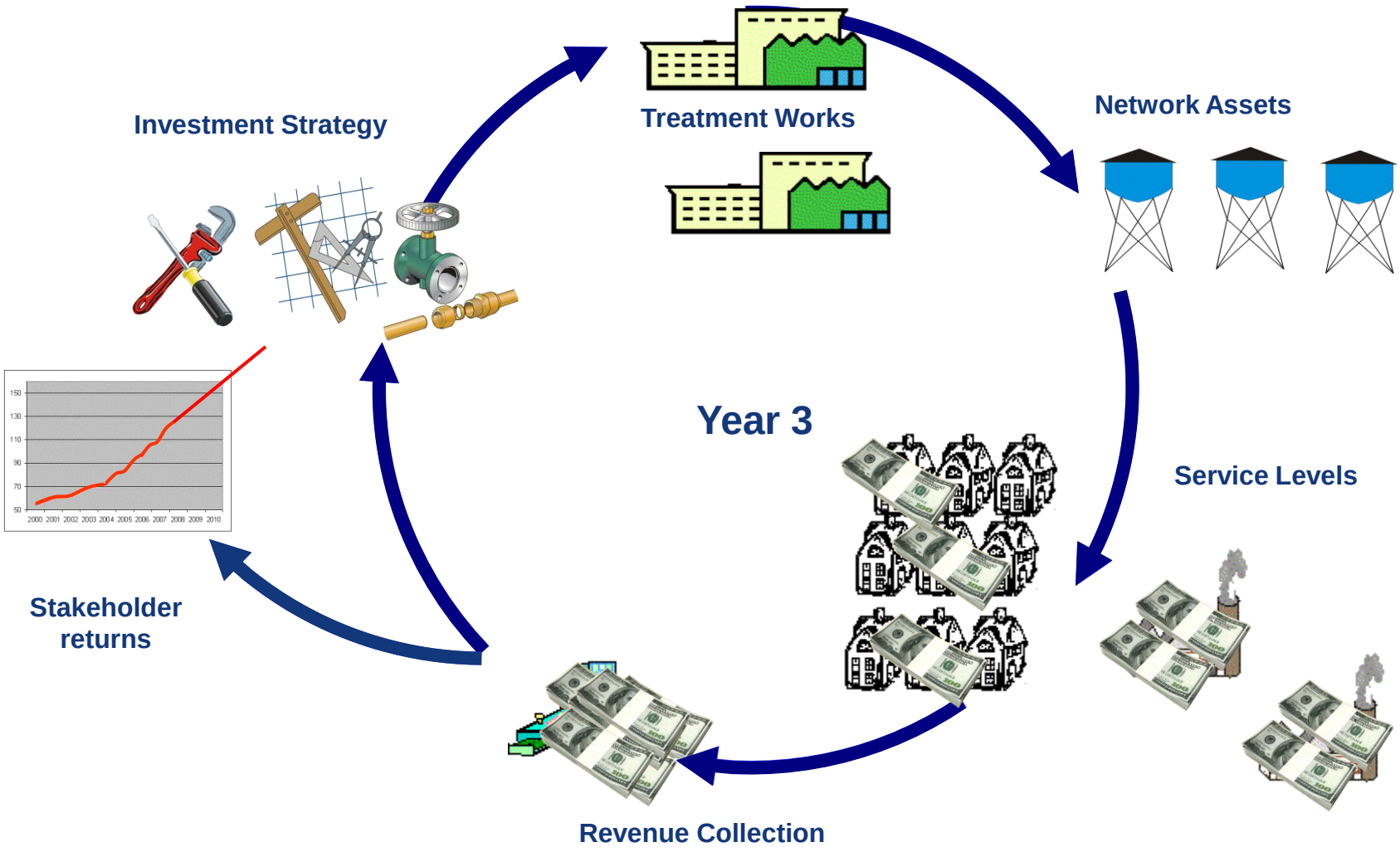
For the implementation of WLR
(long-lasting activity,
not fixed to one location,
installations as well as operational measures
on-site decisions needed
interactive planning unavoidable)

the role of Capacity Development
is of very high priority.

Once, the know-how is there,
and sustains,
the other restrains can be resolved,
successfully !


Investment Strategy
Treatment Works
Network Assets
Service Levels
Revenue Collection
Stakeholder returns
Year 1


Investment Strategy
Treatment Works
Network Assets
Year 2
Service Levels
Revenue Collection
Stakeholder returns


Investment Strategy
Treatment Works
Network Assets
Year 3
Service Levels
Revenue Collection
Stakeholder returns

Political and administrative aspects of NRW

- Financial and technical assistance complement each other (infrastructure and capacity development) in water loss reduction programs
- Introduction of commercial accounting systems and financial management
- Framework conditions can be improved through **decentralisation and commercialisation** (e.g. procurement, financial autonomy)
- Culture of **collaboration and partnership** to strengthen efforts to control corruption and to build up confidence in the water management
- Developing ownership and corporate identity at the top management of water authorities to be backed up with level of ownership within staff of water companies and consumers