

**SUSTAINABLE WATER  
MANAGEMENT IN A**  
*Changing Climate*

13<sup>th</sup> BALKANS JOINT CONFERENCE  
AND EXHIBITION



11-12-13 NOVEMBER 2025  
DURRËS, ALBANIA

**Regulatory and practical principles of water  
infrastructure development**

**Are we rich enough to buy cheap?**

**Dr Károly Kovács PhD (oec)**  
Hungarian Water Association (HWA)  
president

# CONTENT

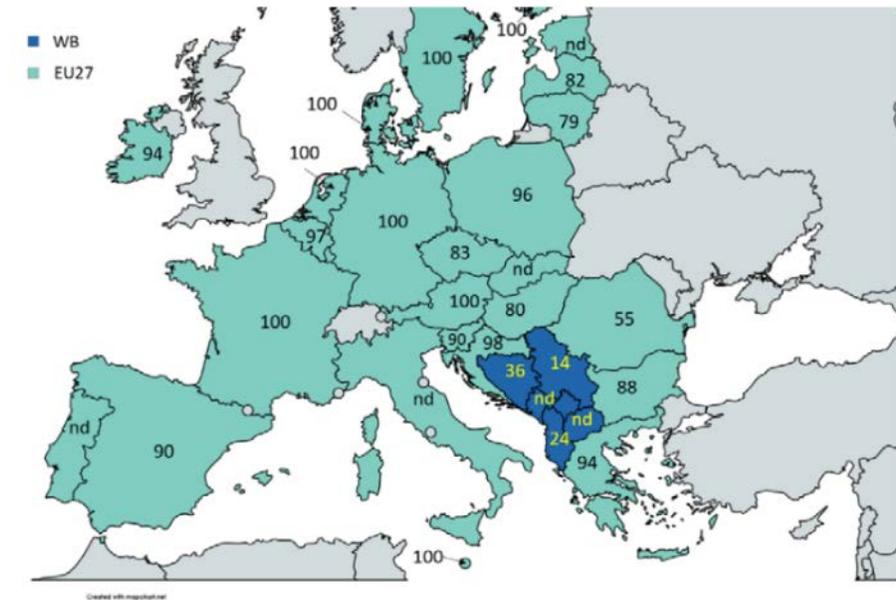
- **Water challenges in WB countries**
- **Main EU regulatory principles**
- **DCC and LCC methodologies**
- **Case study - practical recommendations**
- **Takeaways**

# WATER MANAGEMENT CHALLENGES

## Key challenges

- untreated municipal and industrial wastewater discharge,
- agricultural pollution runoff
- combined effects of climate change
- altered water systems
- **FINANCING INVESTMENTS**
- **FINANCING OPERATION**

Figure 29. Percentage of population connected to wastewater treatment in WB and EU-27 countries.



Source: United Nations Statistics Division<sup>17</sup> (2019).

# WATER INFRASTRUCTURE DEVELOPMENT

The main European Union (EU) **directives** and regulations concerning the provision of water supply and sewerage services

- the Water Framework Directive,
- Drinking Water Directive,
- Directive on environmental quality standards in the field of water policy,
- Urban Wastewater Treatment Directive,
- Taxonomy regulation municipal and industrial wastewater discharge
- Guide to Cost-Benefit Analysis of Investment Projects
- EU Public Procurement Directive

The EU's overarching objective is to guarantee

- access to safe and sufficient water, safeguard the good status of all water bodies,
- efficient utilisation of EU funding sources

# MAIN REGULATORY PRINCIPLES

The EU funding has four main regulatory principles

1. it provides funding only for the investments, not for the operation,
- 2. it is supporting the least cost solutions (feasibility studies, option analysis, public procurement)**
3. the project must be sustainable in technical and financial terms as well
4. the tariffs resulting after the investment must be affordable for the citizens

# MAIN REGULATORY PRINCIPLES

There is a fifth principle supported by the common sense and the European Union as well:

**We are not rich enough to buy cheap!**



≠



professional technical, financial and economic planning and evaluation is required

# PROPER PROJECT PREPARATION

- **Best practice for project preparation and planning**
  - **Dynamic Cost Comparison Calculation (DCC)**
    - Life-Cycle costing (LCC)
    - Option analysis
  
- **Choosing the least cost solutions**

# DYNAMIC COST COMPARISON (DCC)

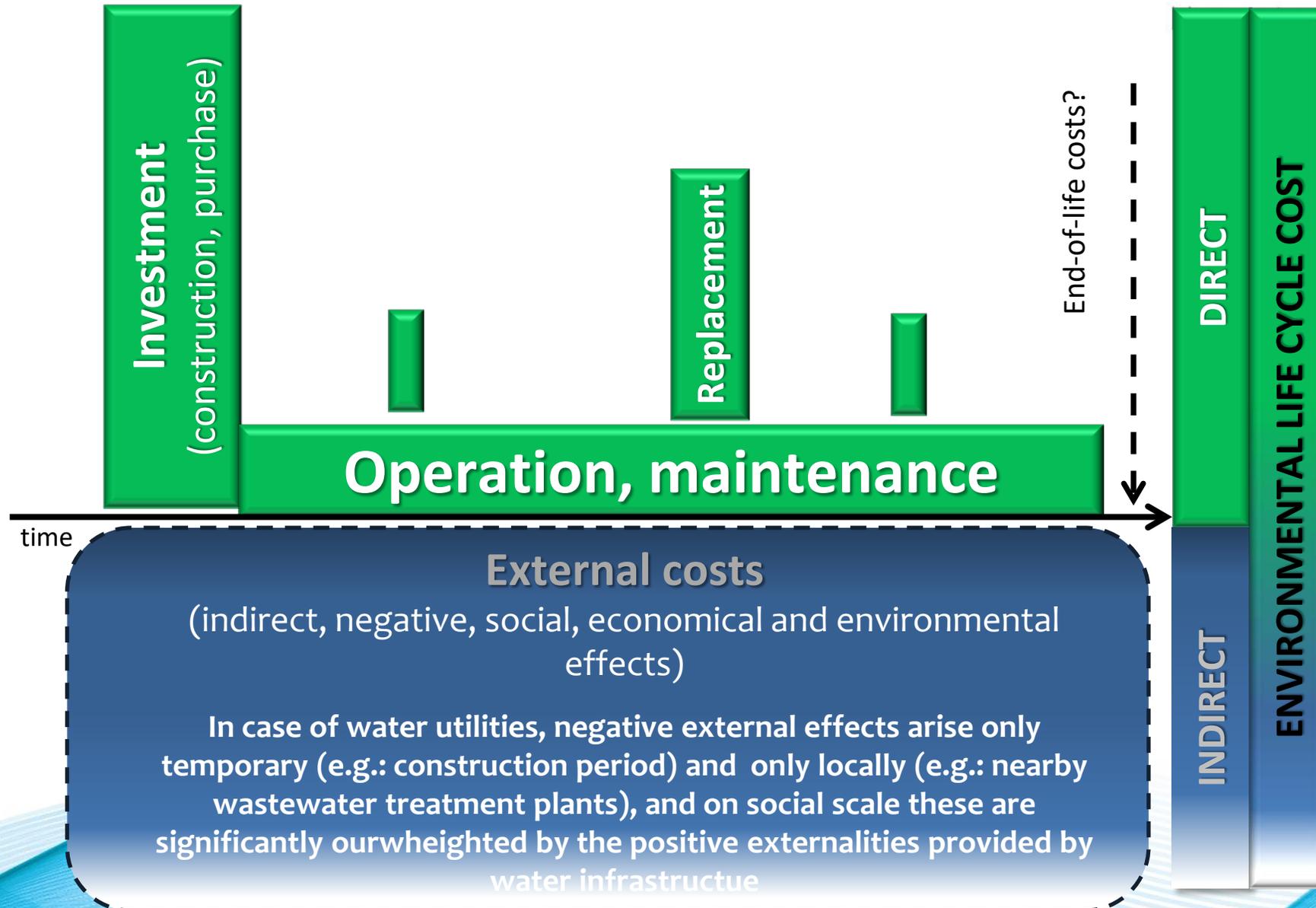
To select the life cycle cost (LCC) and the most cost-effective, optimal solution!

## Main principle (DCC)

Assess cost-effectiveness by considering all life-cycle costs and comparing them at present value

- **Life-cycle & dynamic approach**
- Total costs included
- Aligned with EU standards
- Transparent & professional
- Common ground for engineers and economists

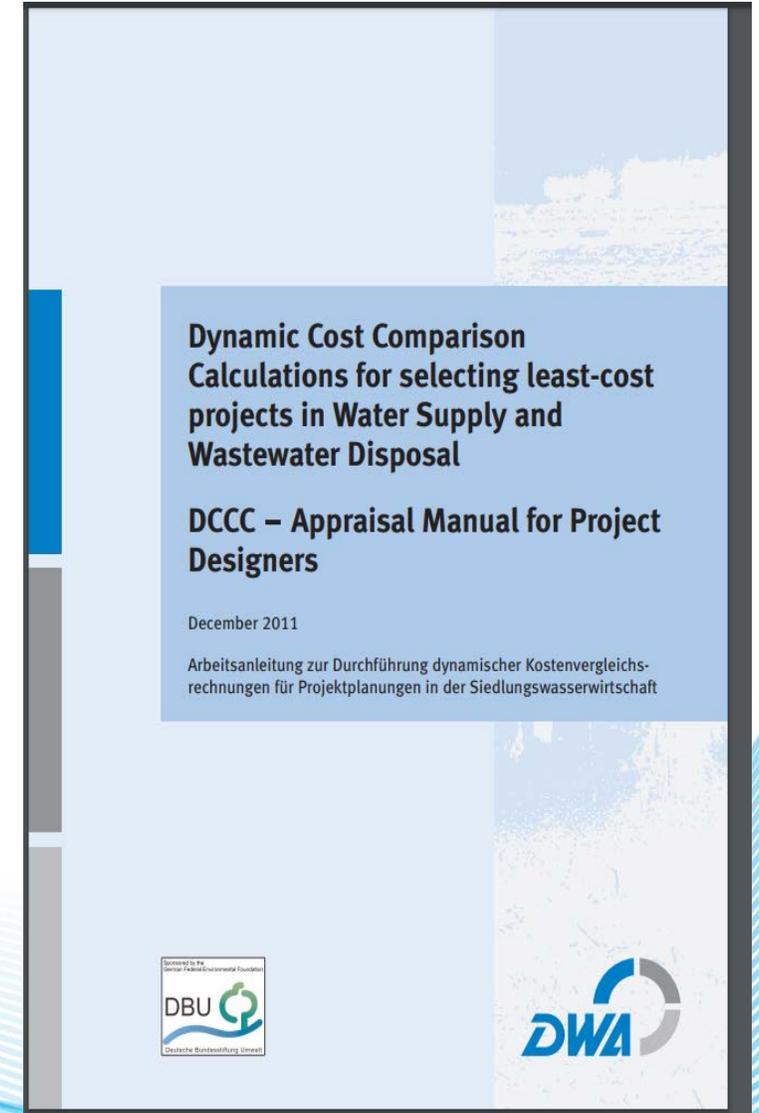
# THE ELEMENTS OF LIFE CYCLE COST



# COST EFFICIENCY OPTION ANALYSIS - INFRASTRUCTURE DEVELOPMENTS

the proper tool for „selecting  
least-cost projects in Water  
Supply and Wastewater Disposal”  
is EWA DCC guide<sup>4</sup>

**Available in 7 languages**



<sup>4</sup> [http://www.dwa.de/dwa/shop/produkte.nsf/1A34AF1A8F92595DC12579A4001ECE52/\\$file/vorschau\\_DCCC-Guidelines.pdf](http://www.dwa.de/dwa/shop/produkte.nsf/1A34AF1A8F92595DC12579A4001ECE52/$file/vorschau_DCCC-Guidelines.pdf)

# LEGAL FRAMEWORK AND PROFESSIONAL BACKGROUND OF LCC



Methodological guide for the practical application of life cycle cost calculation

- Explain the general methodology of LCC, supplementary methodological guideline to the Public Procurement Authority's Guide on LCC
- Easy to understand- economical background is not necessary!!!
- Based on:

HWA (2011): Dynamic Cost Comparison(DCC) Calculations for selecting least-cost projects



KÖZBESZERZÉSI TANÁCSADÓK  
ORSZÁGOS SZÖVETSÉGE



# IMPORTANCE OF LIFECYCLE-BASED PLANNING IN EU-FUNDED PROJECTS

## **When Life-Cycle costs are ignored**

- Systems risk unsustainable operational expenses
- Maintenance quality declines, reducing performance
- Infrastructure may end up worse than before

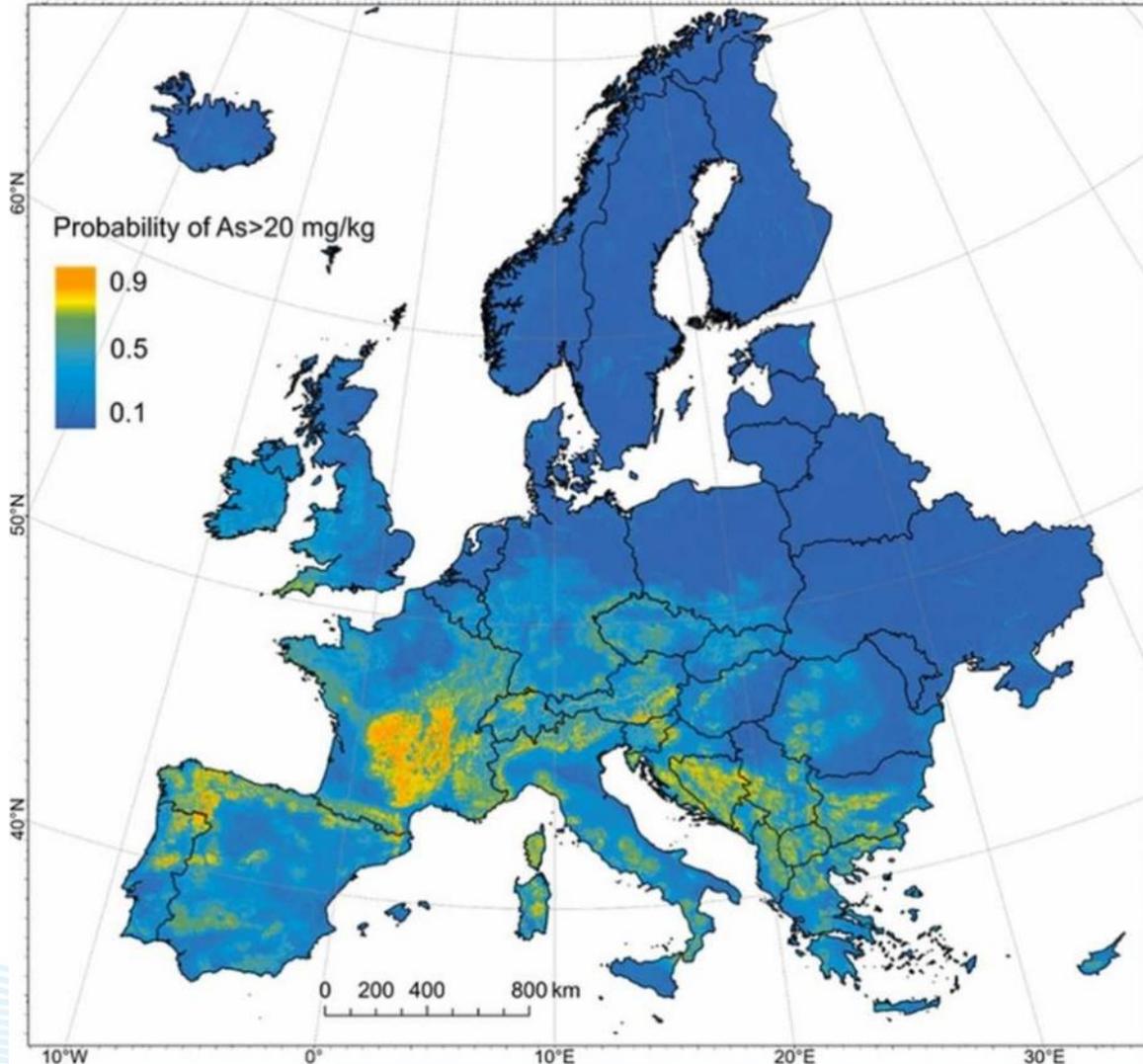
## **With DCC & LCC approaches**

- Enable cost-efficient implementation
- Promote resilient, long-term performance
- Ensure economic and operational sustainability

# Case study

## Arsenic removal

# ARSENIC SITUATION



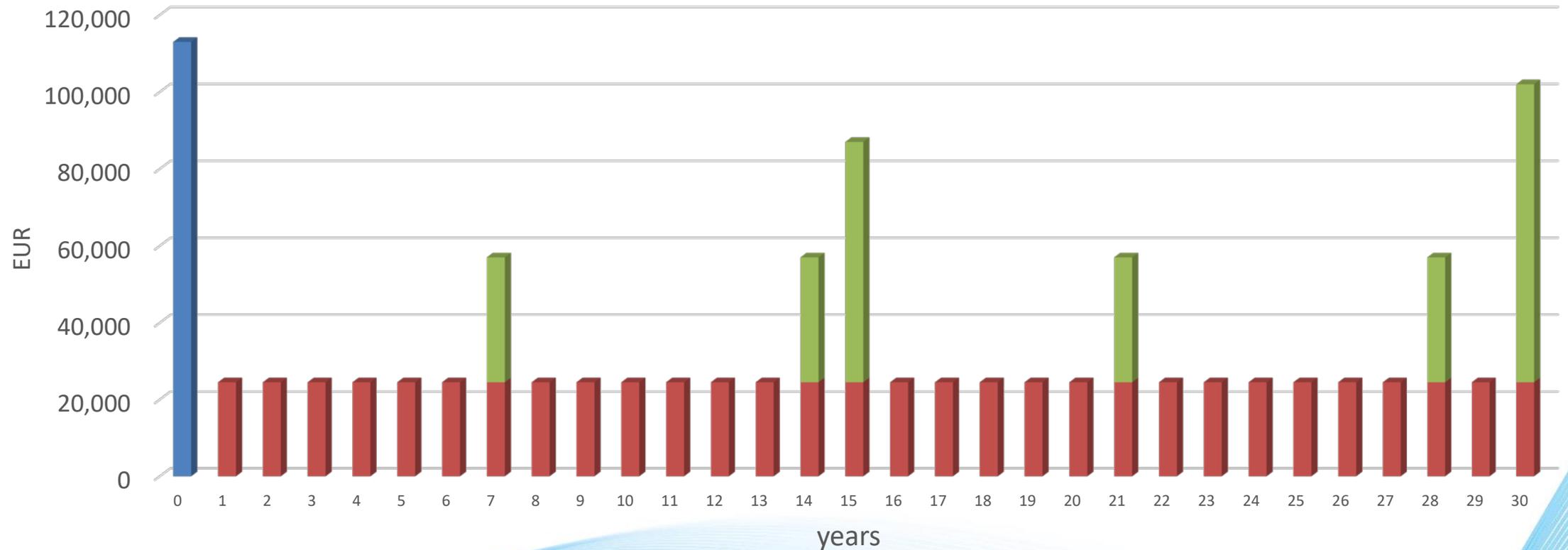
## Probability of geogenic arsenic exceedance in European topsoil

11.7% grasslands, 3.9% croplands >20 mg/kg As; hotspots in France, Spain, W. Balkans, and mountain areas

Dominant crops in affected areas: wheat, maize, rapeseed, and fodder crops

Arsenic mainly driven by mineral deposits, elevation, and climate factors

# THE ELEMENTS OF LIFE CYCLE COST



■ Investment   ■ operational cost   ■ replacement cost

# ARSENIC REMOVAL TECHNOLOGIES COMPARISON

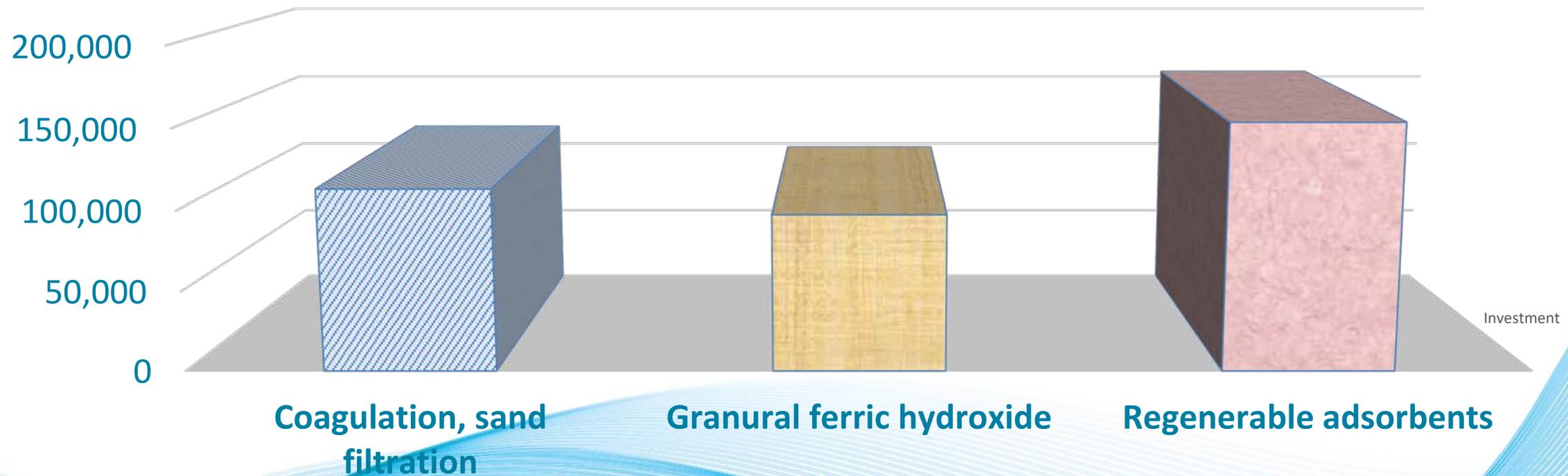


	Coagulation, sand filtration	Granural ferric hydroxide	Regenerable adsorbent
Contaminated water As concentration (ug/l)	28	28	28
Water treatment capacity (m <sup>3</sup> /day)	800	800	800
Purified water As concentration (ug/l)	8	8	8

# HOW TO CHOOSE?

Based on investment costs?

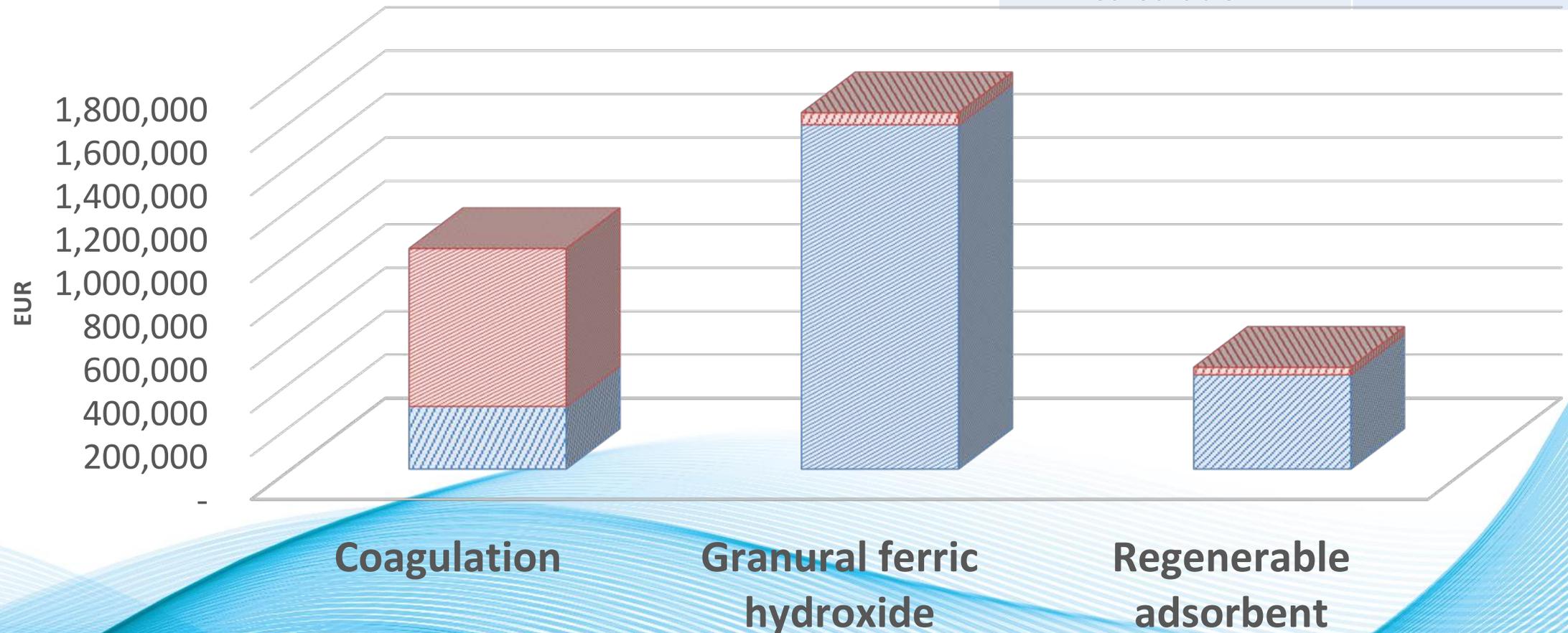
## INVESTMENT COST IN EUR



# WHAT ABOUT THE RUNNING EXPENCIES?

Period examined	30 years
Life-cycle costing (LCC) present value calculation	<b>excluded</b>

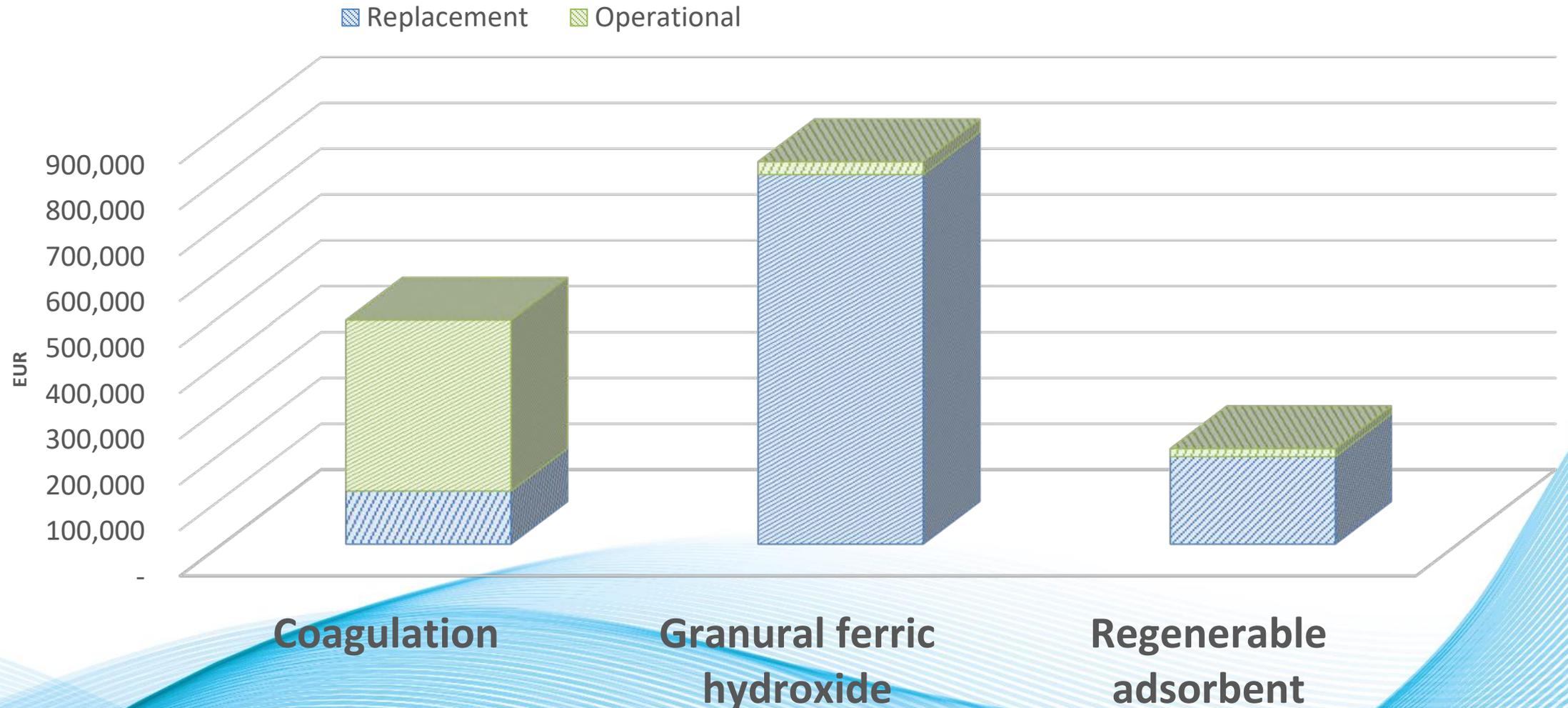
■ Replacement   ■ Operational



# EVEN IF WE DISCOUNT THE FUTURE COSTS

with 5% discount rate on the running expenses

Period examined	30 years
Life-cycle costing (LCC) present value calculation	<b>included</b>



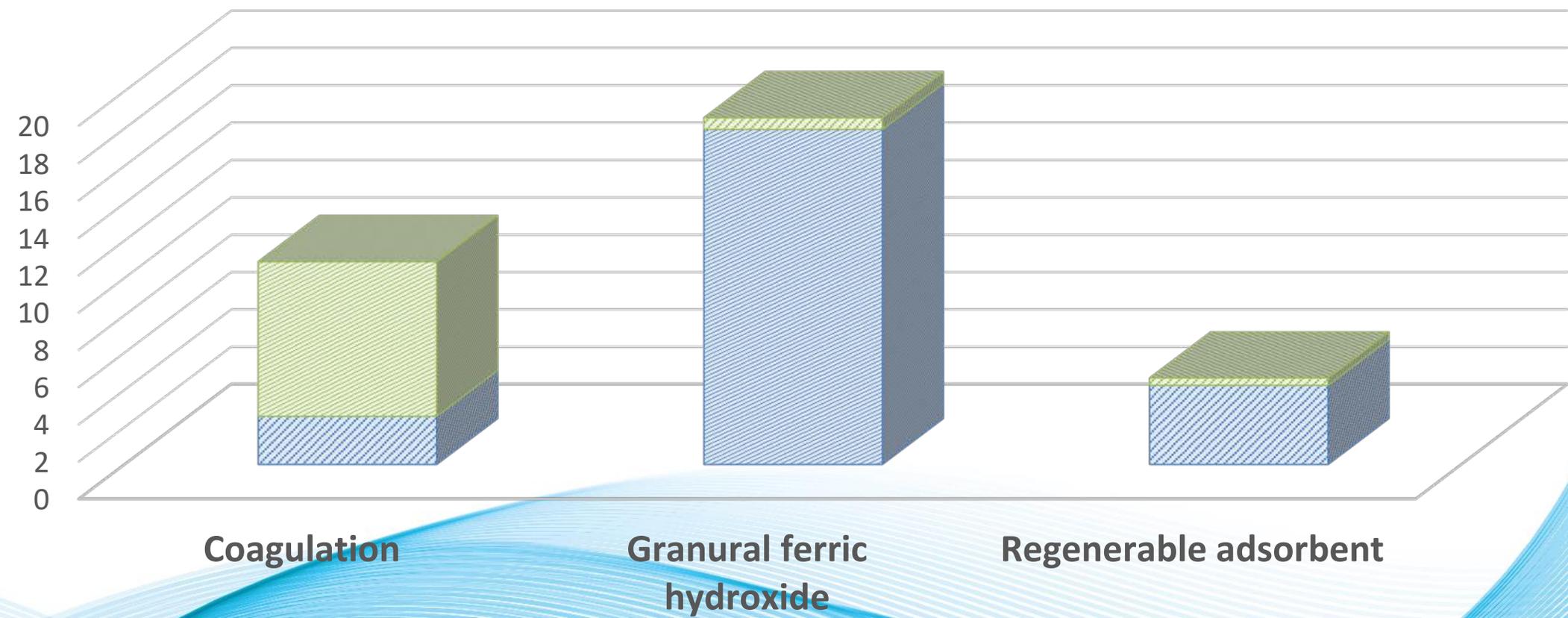
# WHAT TO PAY FOR DURING OPERATION?

with 5% discount rate?



## SPECIFIC UNIT COSTS €CENT/M3

■ replacement unit cost    ■ operational unit cost



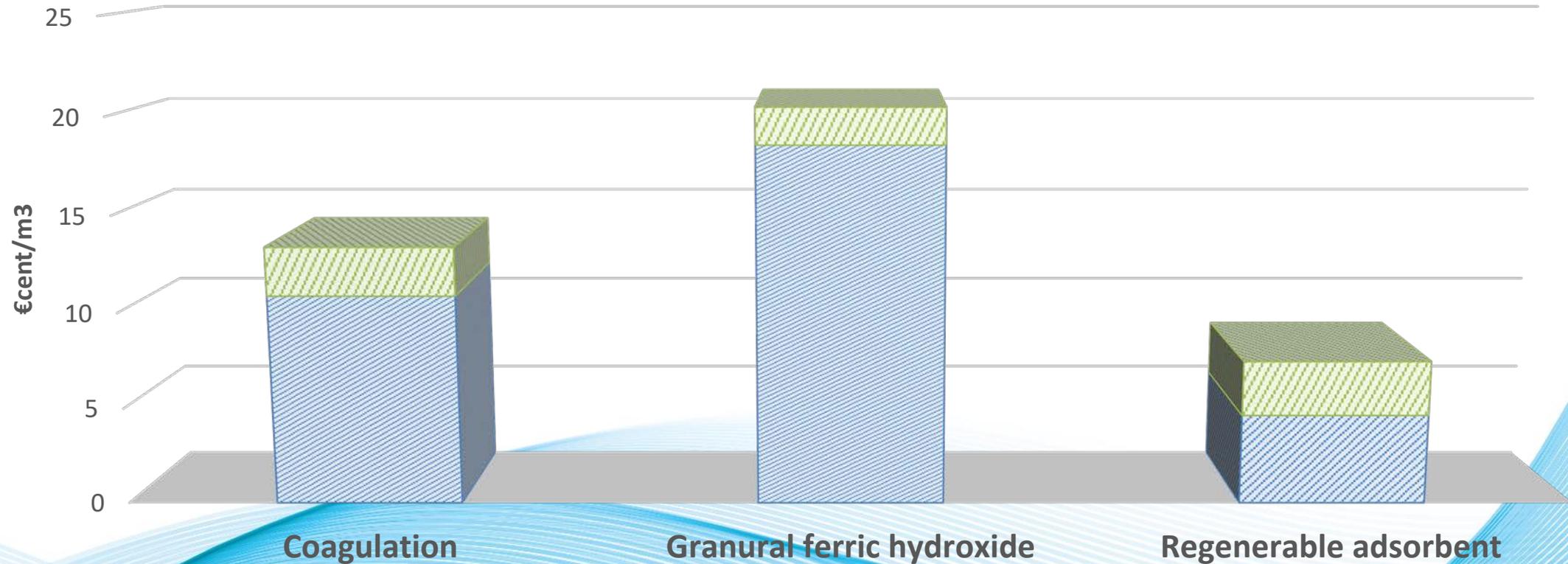
# HOW MUCH TO COLLECT FOR?

Based on the total specific unit costs (eurocent/m<sup>3</sup>)

## TOTAL UNIT COST

investment

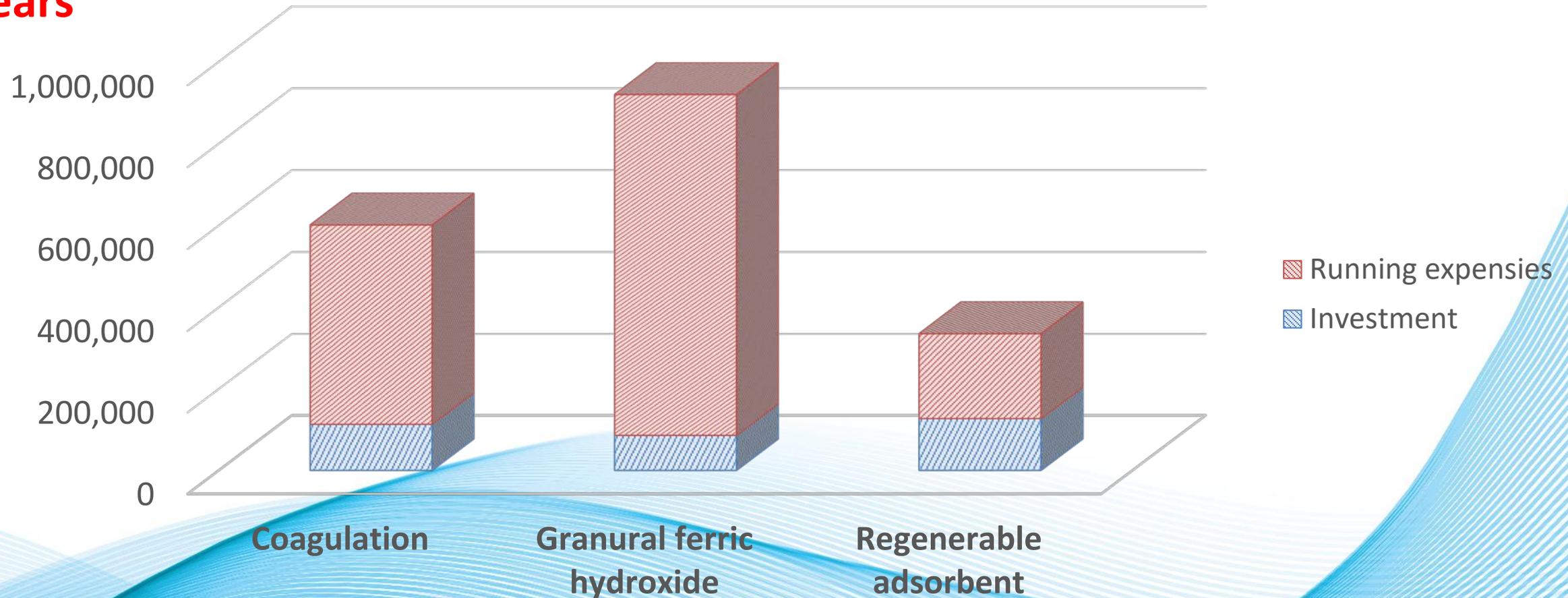
running expenses



# HOW TO CONSOLIDATE THE REGULATORY AND PRACTICAL PRINCIPLES?

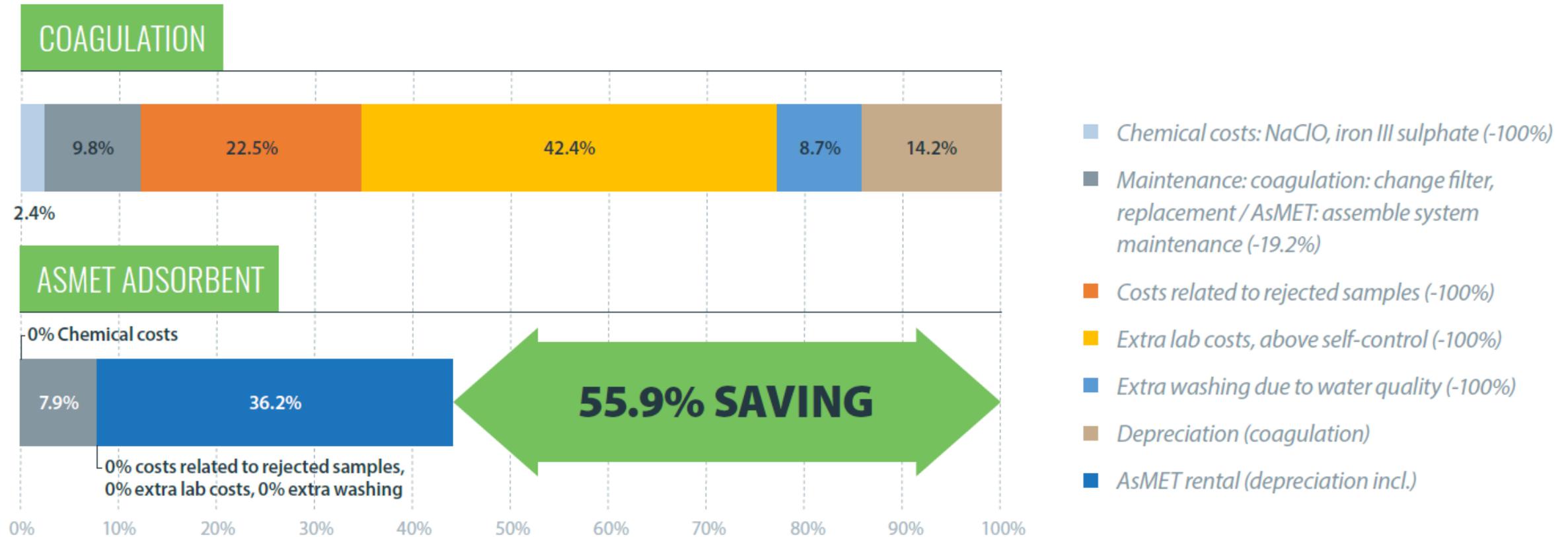
**Based on total  
life-cycle costs!!!!  
30 years**

TOTAL LIFE-CYCLE COST EUR



## COMPARISON OF THE TWO TECHNOLOGY'S OPERATING COSTS

Operating costs of the regenerable adsorbent (AsMET) based arsenic removal technology as a percentage of arsenic removal coagulation technology costs (Tiszagyenda project, Qmax. 16 m<sup>3</sup>/h, avg. 80µg/l arsenic concentration)



# BENEFITS OF DCC AND LCC APPROACHES



- **DCC (Dynamic Cost Comparison) & LCC (Life-Cycle Costing):**
  - Identify cost-efficient, and economically viable solutions.
  - Enable selection of affordable solutions
- **Outcome:**
  - Keep operational costs low – cost recovery in operation
  - Provide operational sustainability

# TAKEAWAYS

## ✓ Need for strategic planning:

By quantifying lifecycle costs, efficient and sustainable technologies can be identified, enabling long-term affordability and resilience

## ✓ Aligned with EU directives and principles – **think smart, act sustainably**

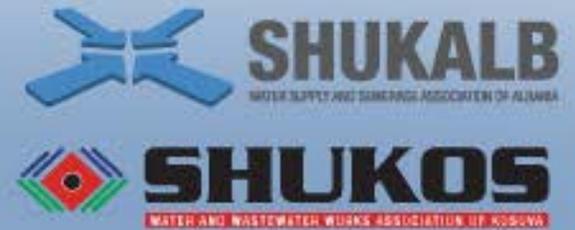
The methodology and case studies presented support both EU Member States and accession countries in preparing successful, sustainable water infrastructure projects **with the lowest operating costs**



**Needs for capacity building?!**  
**We are ready to share...**

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## Thank you for your attention!

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