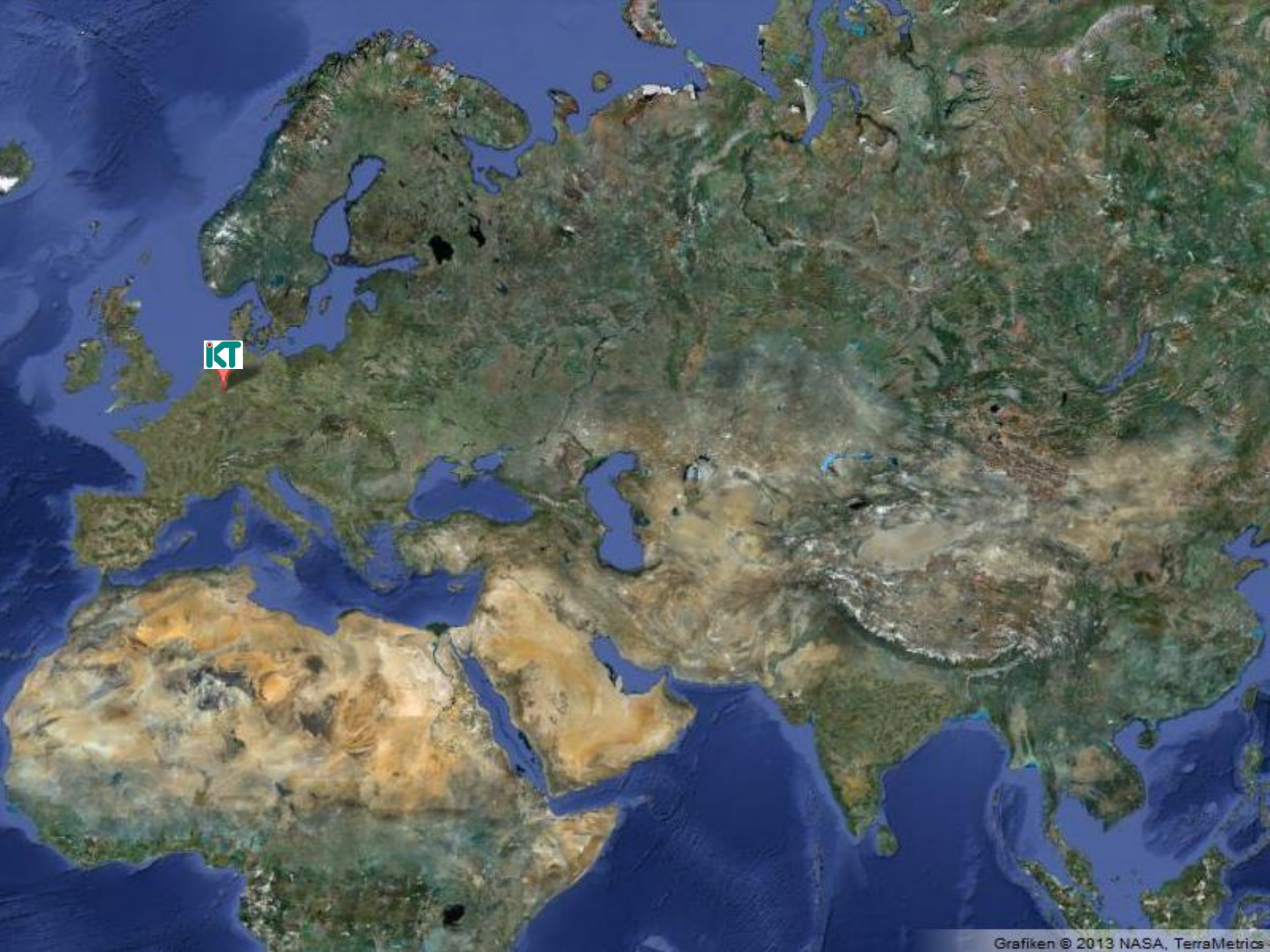




Financing of Water Infrastructures

Roland W. Waniek
IKT – Institute for Underground
Infrastructure, Germany



IKT – Institute for Underground Infrastructure

- **Neutral, independent, not-for-profit**
- **Spin-off from Bochum University**
- **Funded by Ministry for Environment (1994)**
- **Owned by two associations:**
 1. **Public sector: 150 member cities hold 2/3 of IKT shares**
 2. **Private sector: 60 companies hold 1/3 of IKT shares**

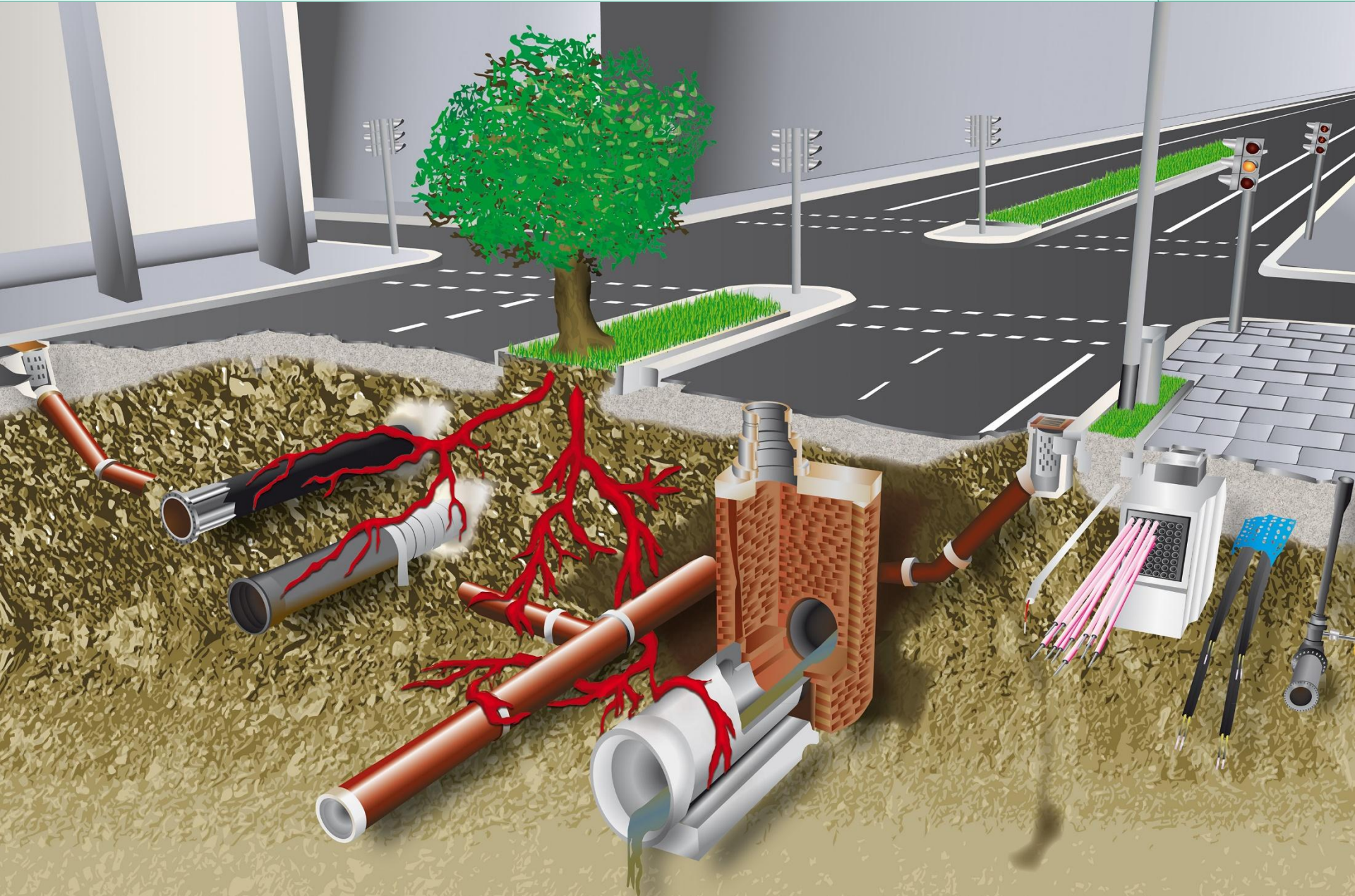
IKT has five major fields of activities:

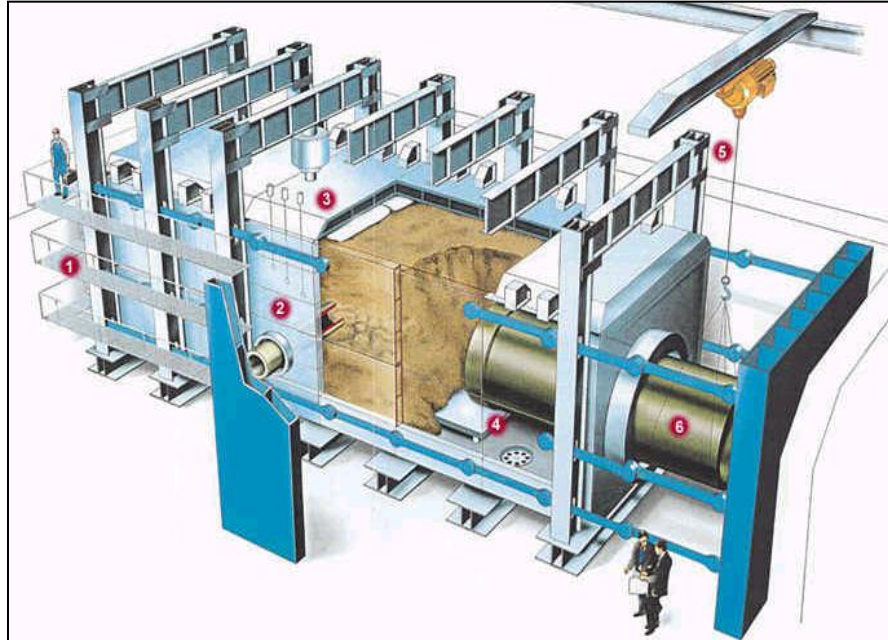
- 1. Research**
- 2. Comparative Product Tests**
- 3. Material Test Centre**
- 4. Seminars and Advanced Training**
- 5. Consultancy**



Gelsenkirchen (D) – Arnheim (NL)







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> 1.0 trillion €

~ 1,600 km underground transport systems
(600 km rapid transit tunnels ^[1], 770 km
mainline railway tunnels ^[2], 250 km road tunnels ^[3]) ⇒ 45 bn € ^[4]

575,800 km sewers ^[5], ⇒ 631 bn € ^[4]

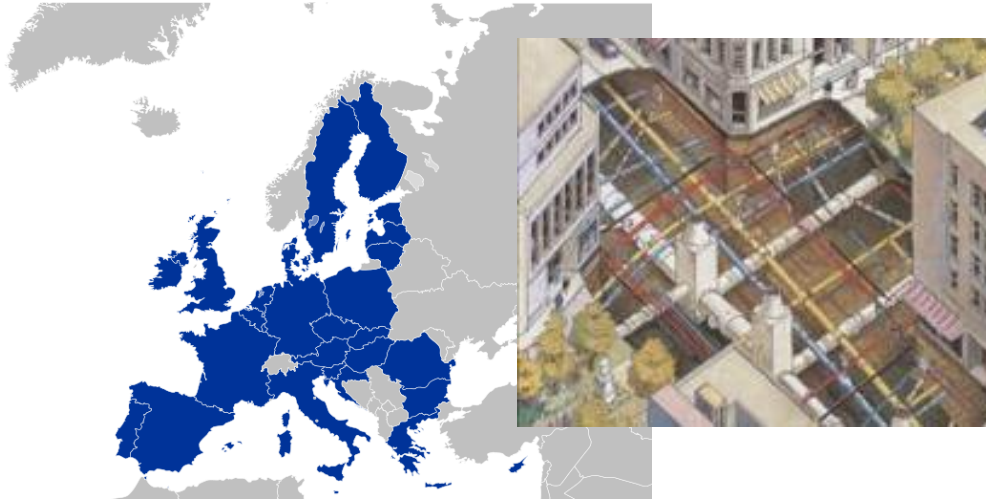
530,000 km water pipes ^[6] ⇒ 159 bn € ^[4]

510,000 km gas pipes ^[7] ⇒ 153 bn € ^[4]

25,200 km district heating pipes ^[7] ⇒ 16 bn € ^[4]

+ pipelines, cables, pneumatic post, waste air, goods

[1] Sicherheitsfragen beim Bau und Betrieb von Verkehrstunneln, 2003 [2] Statistik der Eisenbahn-Tunnel in Deutschland, 2011, www.eisenbahn-tunnel-info.de/inhalt/statistik.html [3] BVBS, BAST: Sicherheit geht vor - Straßentunnel in Deutschland. 2009 [4] IKT-Schätzung 2016 [5] DWA-Umfrage 2015 (ohne private Kanalisation) [6] Branchenbild der deutschen Wasserwirtschaft 2015 [7] Bundesverband der Energie- und Wasserwirtschaft e. V., 2014



> 2.4 trillion €

~ 10,000 km undergr. transport systems ^[1] ⇒ 142 bn € ^[1]

2,500,000 km sewers ^[1], ⇒ 1.371 bn € ^[1]

3,495,000 km water pipes ^[1] ⇒ 535 bn € ^[1]

2,030,000 km gas pipes ^[2] ⇒ 305 bn € ^[1]

200,000 km district heating pipes ^[3] ⇒ 66 bn € ^[1]

+ pipelines, cables, pneumatic post, waste air, goods

[1] IKT estimate 2016 (EU-28) [2] European Commission 2011 (EU-28) [3] Euroheat&Power, 2011 for EU-27 (not includ. Croatia)

Importance of Water and Sewer Pipes:

- **High Capital Costs**
- **Long Service Life (> 80 years)**
- **Determine Long-term Economic Development and Growth**
- **Public Decision Making**
- **Water and sewer pipes value 80% of Underground Assets**

Different Models for Water Financing:

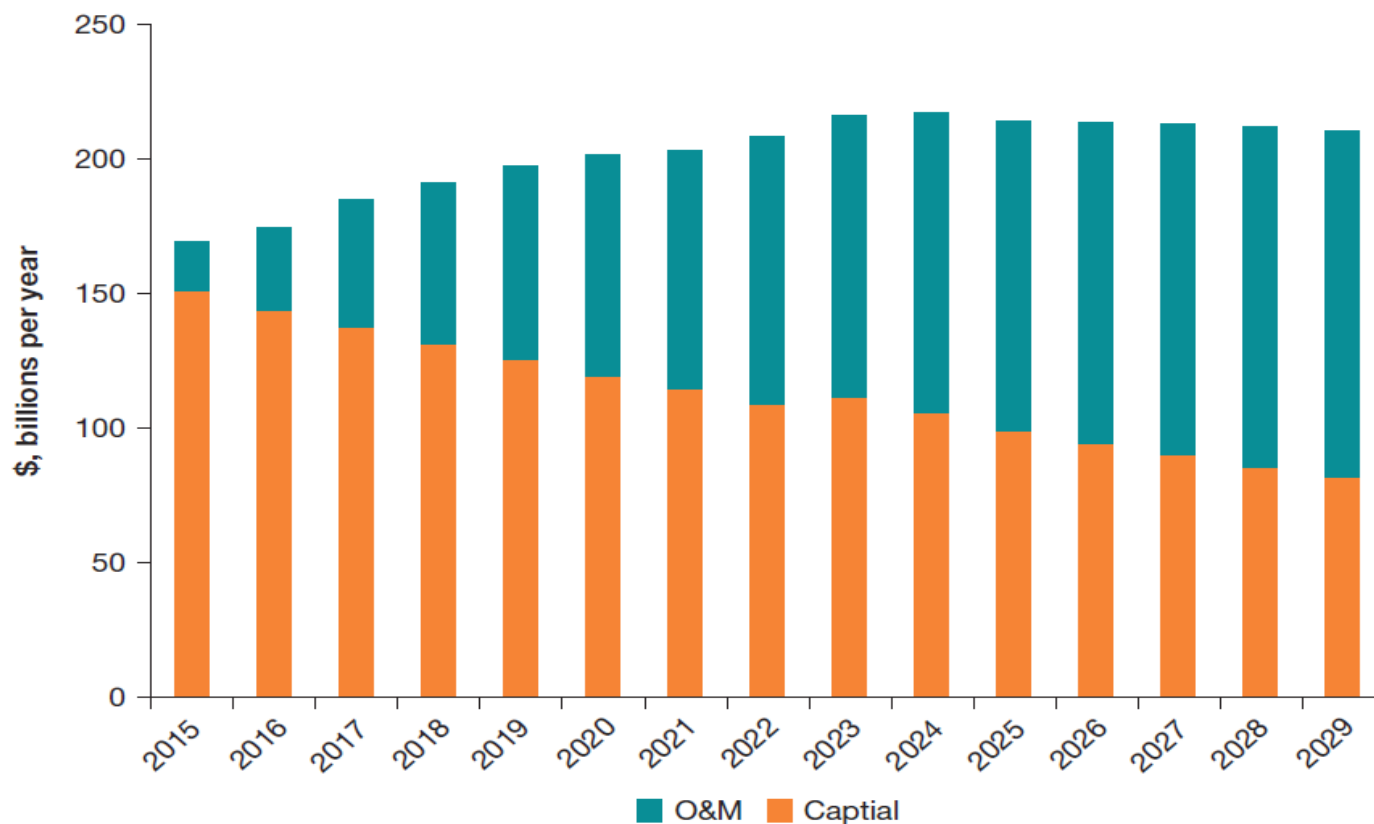
- 1. Fees and Abstraction Charges
with total cost recovery from users**
- 2. Government Budget (taxes) or Loans from
Government Banks
no cost recovery from users**
- 3. Municipal Bonds
with or without cost recovery from users**
- 4. National Revolving Funds
with or without cost recovery from users**

Problems:

- **Politicians want to keep fees and taxes low, sometimes too low**
→ **risk of under-investment**
- **Replacement Costs are difficult to estimate**
- **Assets may not attain expected Service Life Time**
→ **extra costs, possible not covered**
- **Operation and Maintenance Costs are often disregarded or underestimated**
→ **fees and budgets too small**

FIGURE 3: CONSTANT FINANCING NEEDS: AS INVESTMENT NEEDS DECLINE TO SERVE THE UNSERVED, O&M GOES UP

Time Series of Total Annual Costs to Achieve SDG Targets 6.1 and 6.2, Comparing Capital and O&M Costs: 2015–29



Note: O&M = operations and maintenance.

Problems:

- **Politicians want to keep fees and taxes low, sometimes too low**
→ **risk of under-investment**
- **Replacement Costs are difficult to estimate**
- **Assets may not attain expected Service Life Time**
→ **extra costs, possible not covered**
- **Operation and Maintenance Costs are often disregarded or underestimated**
→ **fees and budgets too small**

Insufficient Budgets for Operation and Maintenance Costs means:

- **Leading to Increase in Disrepair and Service Failure**
- **Water and Sewer Pipes Deteriorate faster than necessary**
- **Service Life Time many not be achieved**
- **Overall increased costs**

Solutions:

- **Binding Legal Prerequisite to Allocate Sufficient Budgets for Operation and Maintenance**
- **Procedures and Rules for Maintenance**
- **Better Training and Permanent Education of Staff**
- **Better Use of Data**
- **Co-operation and Networking of Cities and Utilities**

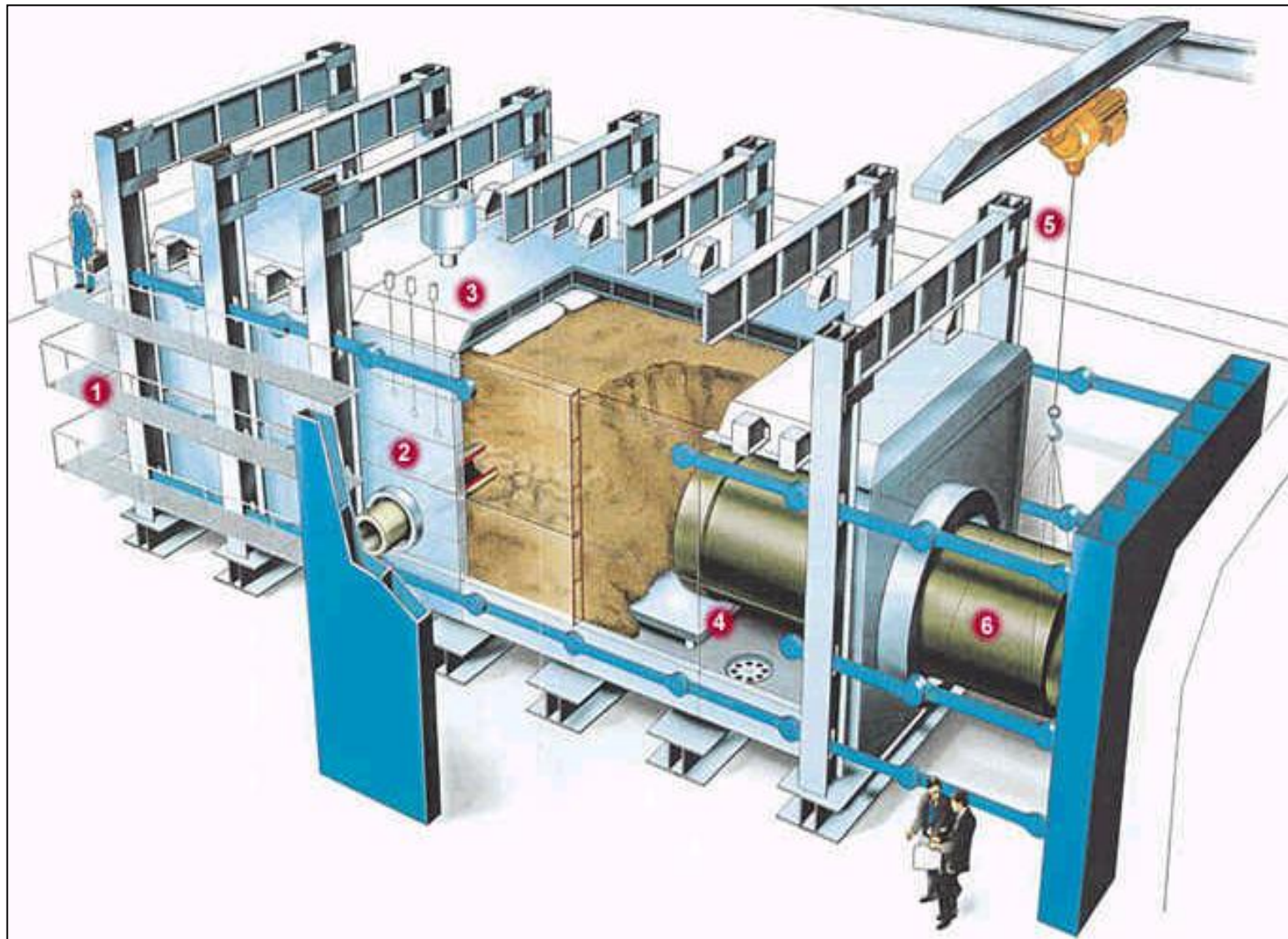
Co-operation and Networking of Cities:

- **Exchanging Experience**
- **Common Research Projects**
- **Testing of Materials, Products and Technologies**



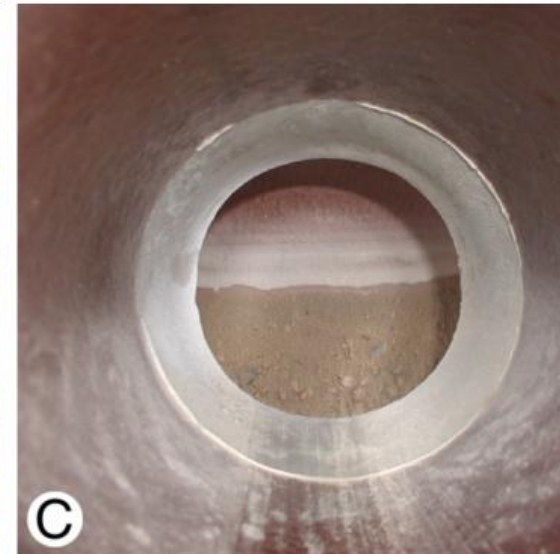
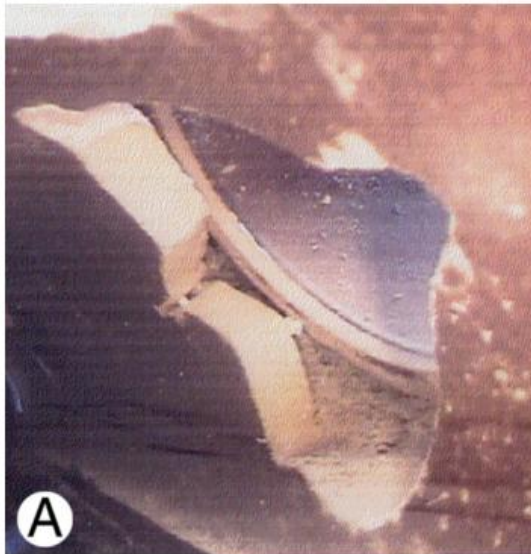
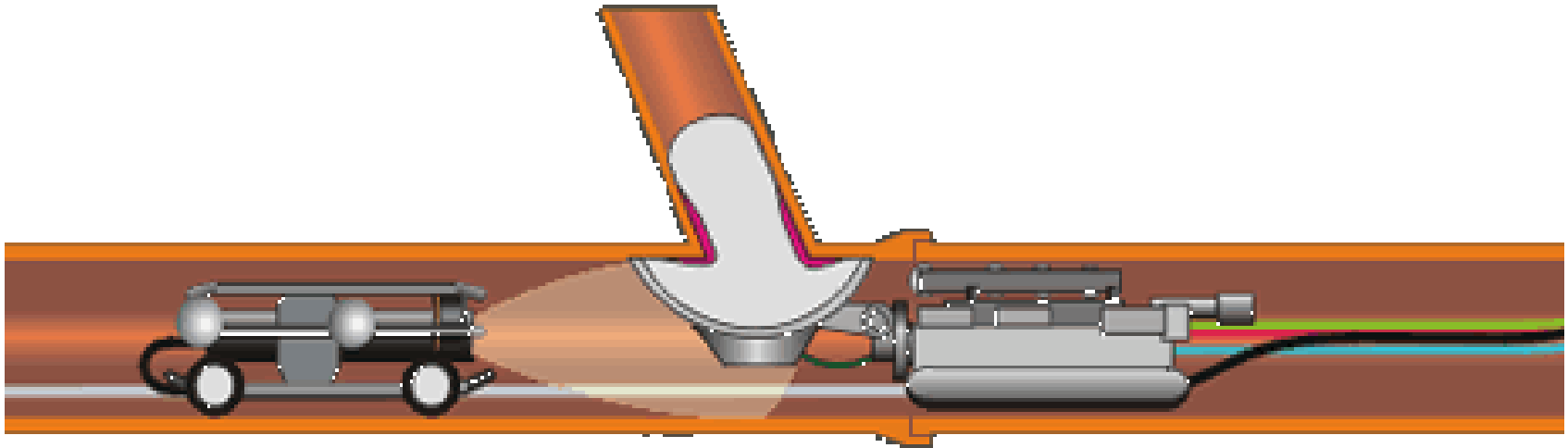
IKT's Activities:

- **Establishing of Network with more than 150 Cities (national and international)**
- **Cities Discuss and Decide Research Agenda**
- **Co-operative Research Projects**
- **Funding through Cost-sharing**
- **Exchange of Experience on national and international Level**

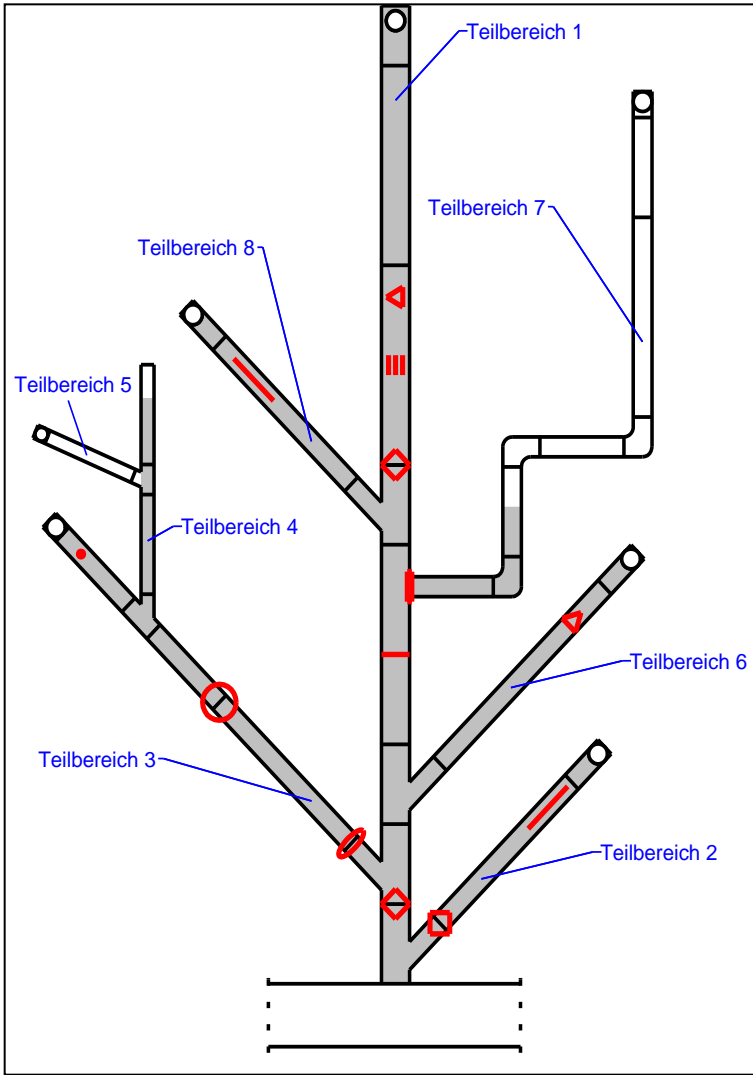




Repair Methods for Lateral Connections



CCTV (optical) Inspection of Laterals



Rehabilitation of House Connections (CIPP)



Manhole Rehabilitation



Sewer Jetting



- **Market Overview:
Objective Information on Quality**
- **Potentials for Improvement**
- **Pressure for Improvement**
- **Investment Safety**
- **Scope for International
Co-operation**



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