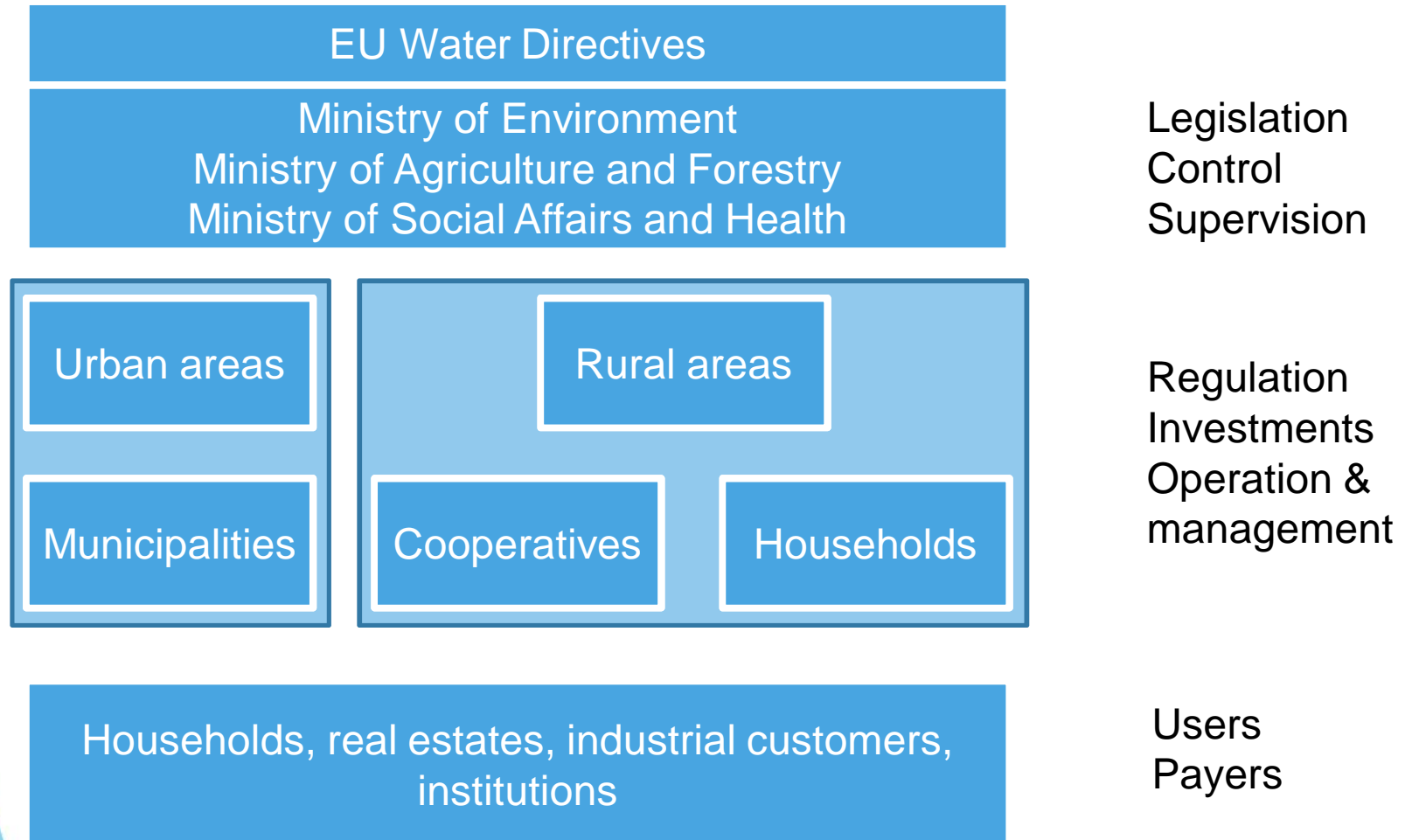


Urban water supply and wastewater treatment in Finland Legislation and Practices

Jyrki Laitinen,
Finnish Environment Institute SYKE
18.8.2015

Water Supply and Sanitation Institutions and Responsibilities

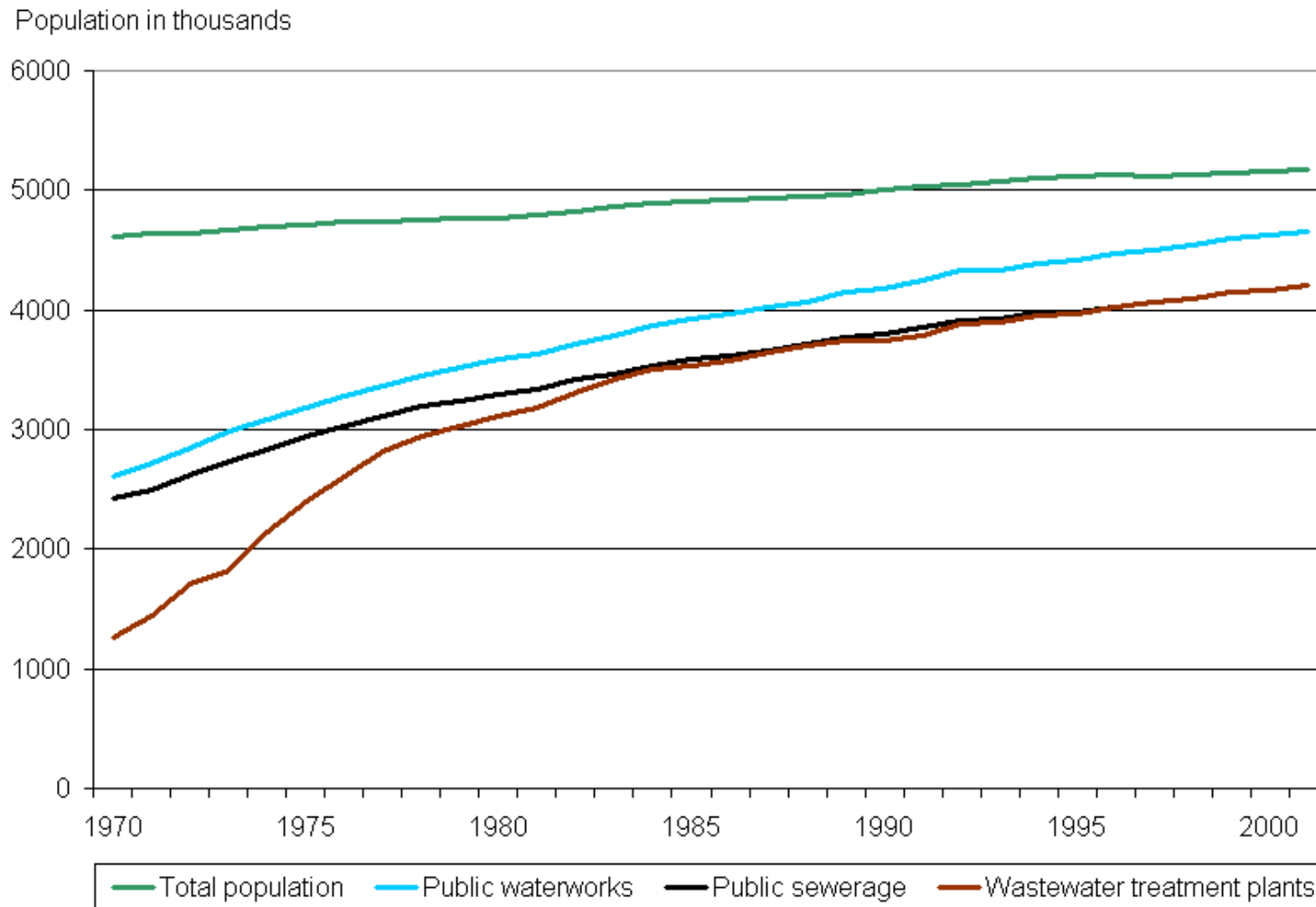


Urban Water Supply and Sanitation

Municipalities are responsible of water supply and sanitation inside population centres

- Municipalities may take care of water supply and sanitation by themselves or outsource it to private companies.
- Usually municipalities establish their own water utility for the task. The water utilities might be municipally owned enterprises or companies.
- Water utilities take care of investments, operation and maintenance and invoices the costs in water fees
 - Connection fee (x euros when connected)
 - Fixed fee (y euros in a month)
 - Consumption fee (z euros/m³)
- Water quality requirements are given by WHO, EU and the national authorities

Coverage of water and sewerage services

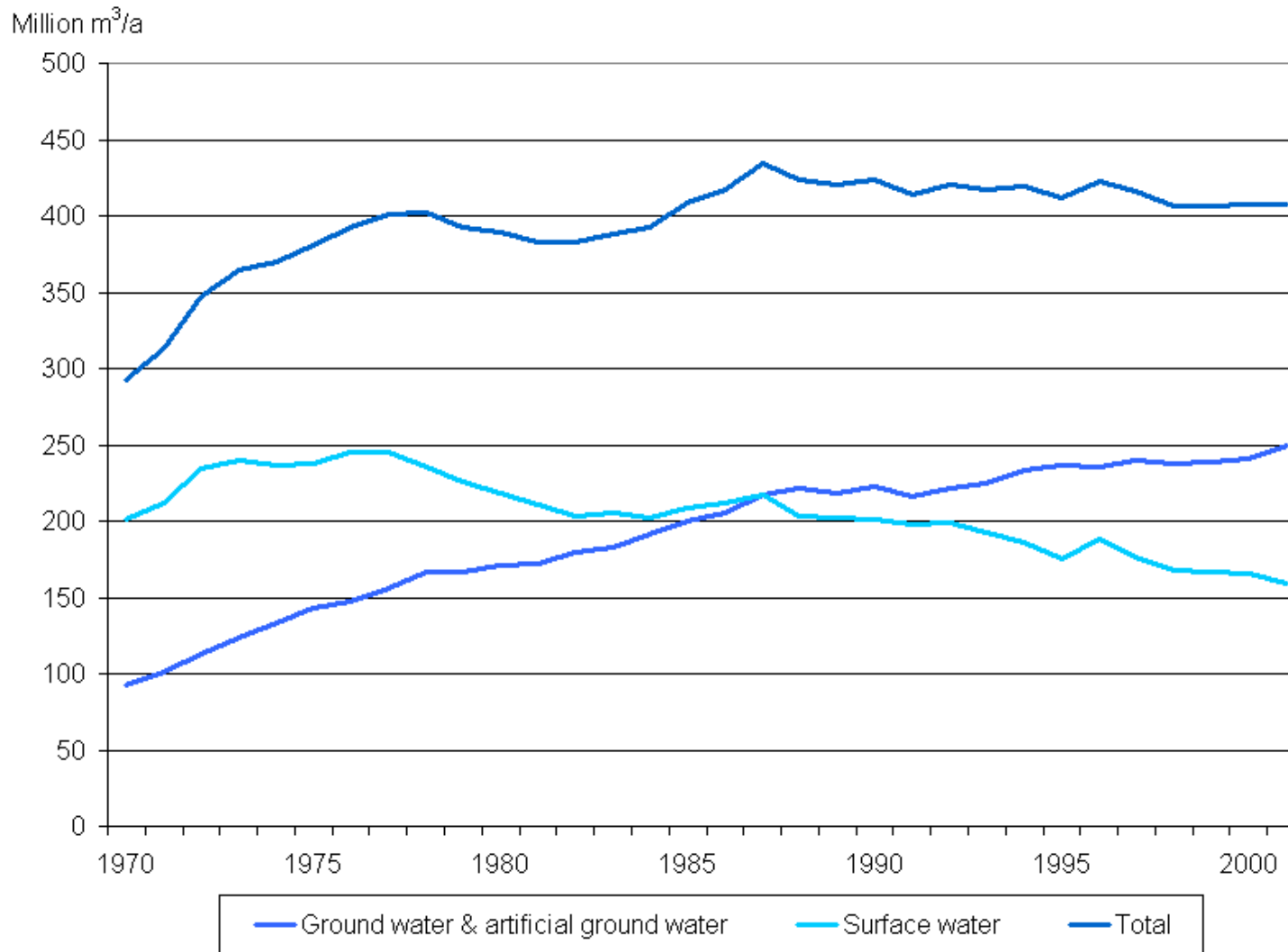


Public Water Supply and Sewerage Act 2014

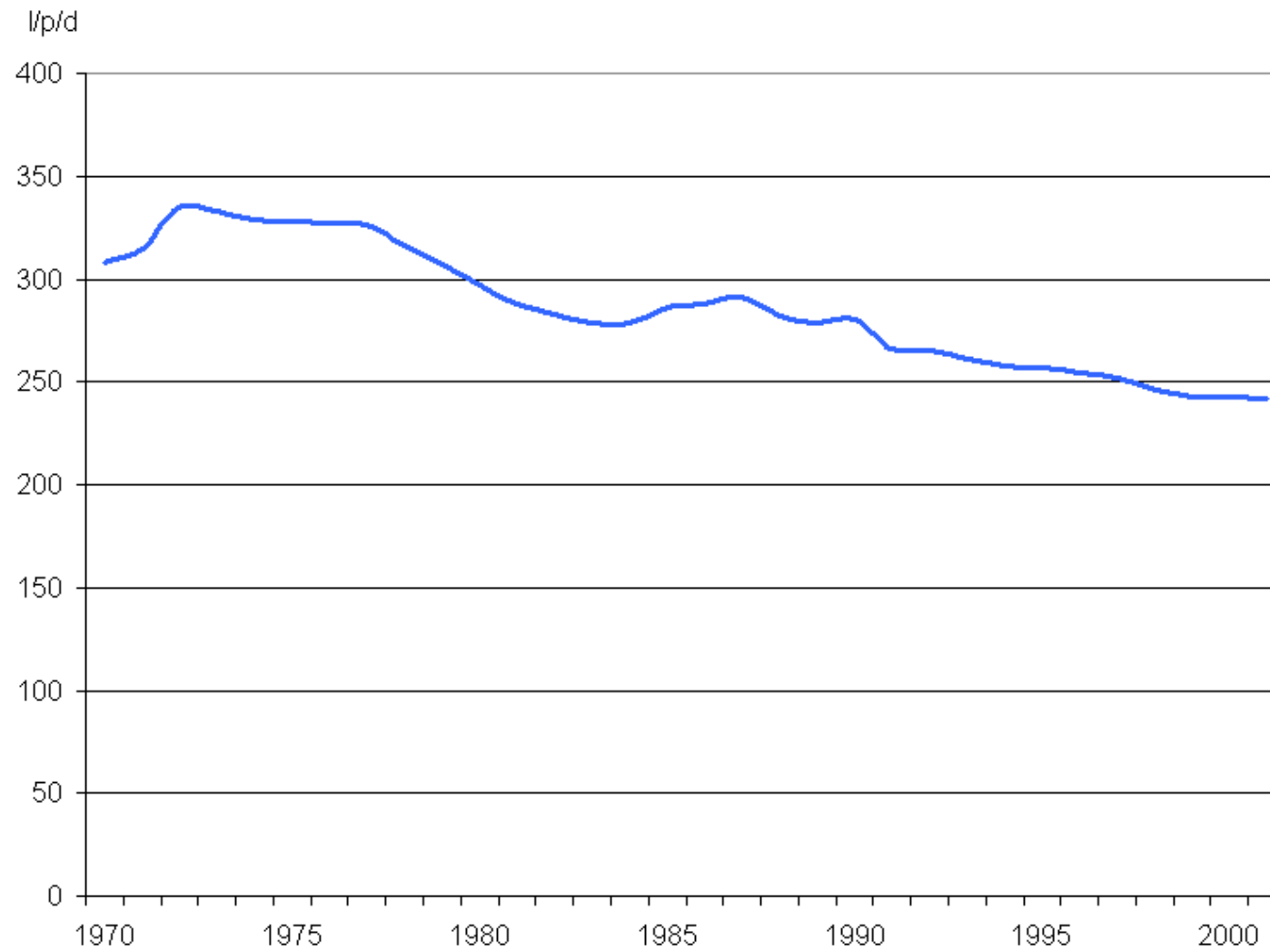
Changes in the new legislation aims to improve

- Information management
 - A new data management system is introduced in the Act and water utilities are responsible to enter their annual data into the system. The system is owned by the Ministry of Agriculture and Forestry and maintained by Finnish Environment Institute SYKE
- Transparency in the management of finances of the utilities
- Storm water management
- Different kind of on-site solutions in water supply and sanitation

Raw water sources for municipalities



Development of the specific water consumption

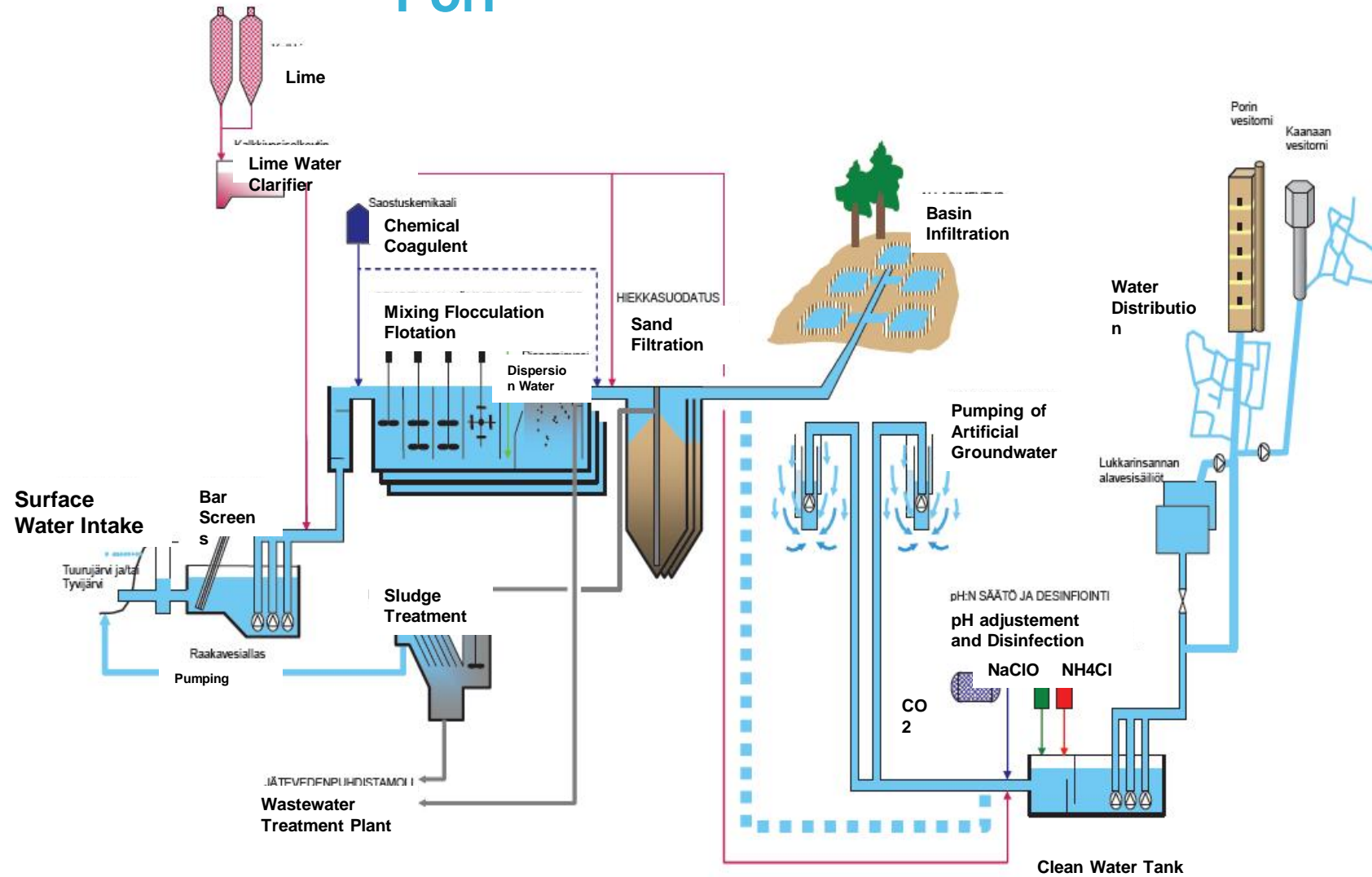


Ground Water Treatment Processes In Finland

- The quality of Finnish ground water is basically good
- In some areas iron and manganese need to be removed
- Slow sand filtration, two-stage sand filtration and re-infiltration are used for removal
- pH adjustment can be done naturally by lime stone filtration or by chemicals

Harjakangas Artificial Groundwater Treatment Plant, Pori

ESILAITOS



An aerial photograph showing a large, blue lake in the upper right portion of the frame. The lake is surrounded by green grassy areas and a dense forest of evergreen trees. In the lower left portion of the frame, there is a large industrial building with a dark roof and a smaller, light-colored structure next to it. A paved road leads to the building. The text "Surface Water Intake" is overlaid on the lake, and "Pre-treatment Plant" is overlaid on the building area.

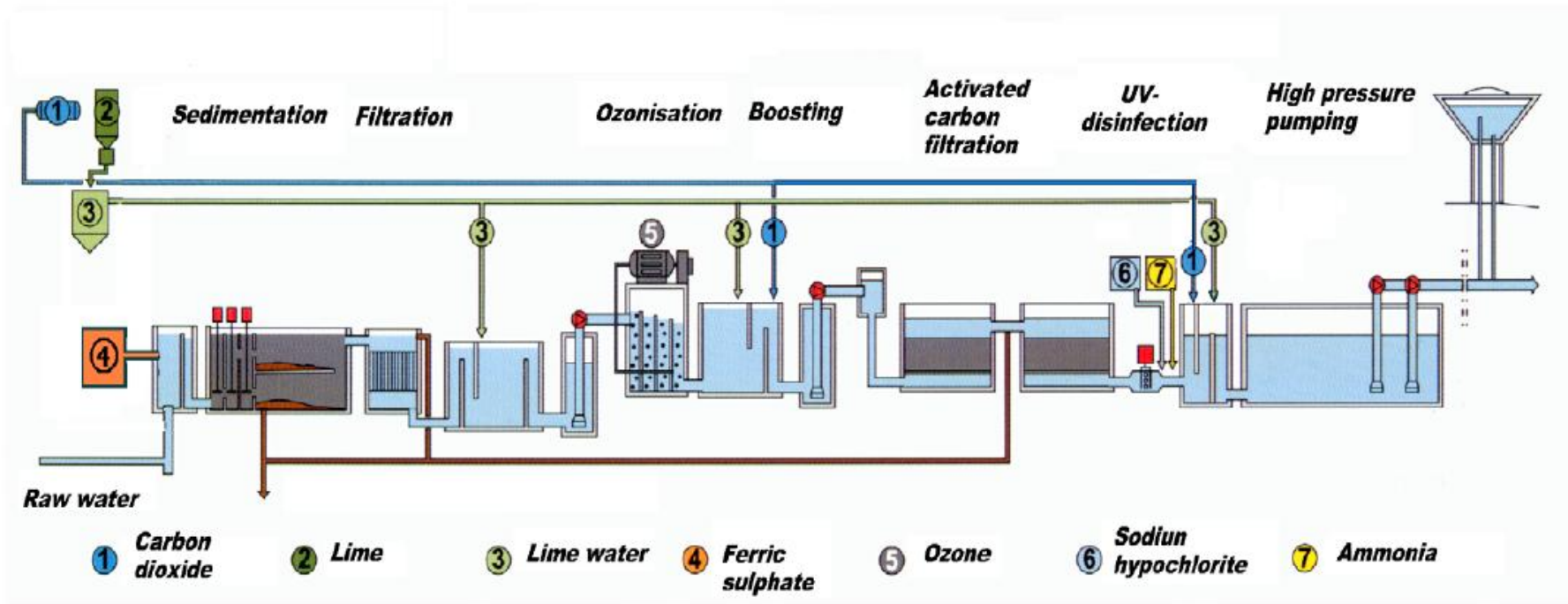
**Surface Water
Intake**

**Pre-treatment
Plant**



**Sprinkler
infiltration**

Multistage Advanced Surface Water Treatment Process, Helsinki

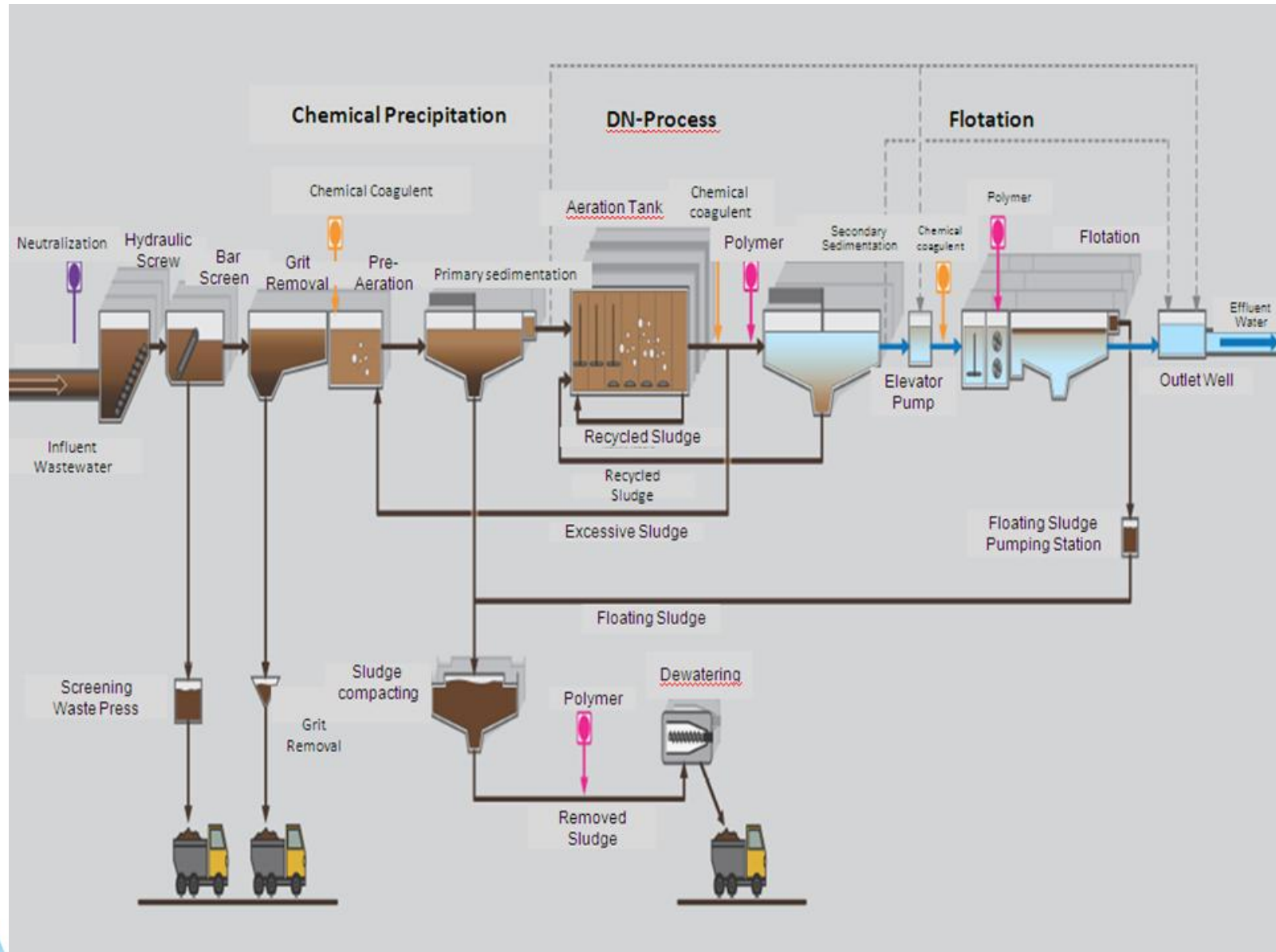


Urban Sanitation

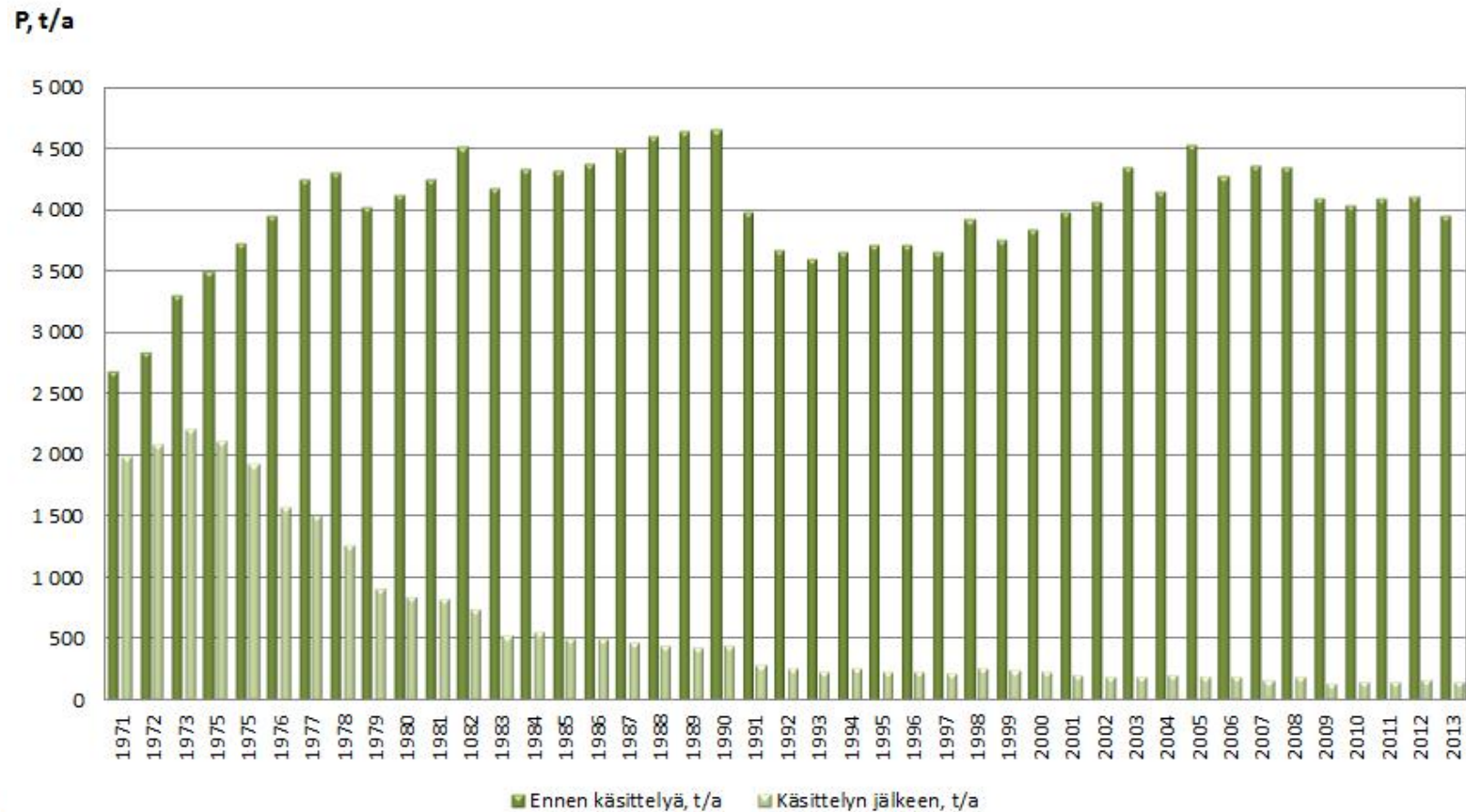
- 540 WWTPs (PE > 50), mostly municipally owned
- Treatment efficiency 2007: BOD7 97 %, P_{tot} 95 %, N_{tot} 56 %
- Treatment requirements in environmental permits
- N-removal being introduced

- Mixed tariffs (connection fee + fixed fee + consumption fee)
- Full cost recovery (investments + O&M)

Urban WWTP, biological and chemical process



Phosphorous Discharge from Municipalities



Pricing

- Main costs of a water utility are investment, personnel, energy, chemicals and maintenance costs
- Municipal water utilities invoice combined drinking water and wastewater fee
 - Connection fee, for investment
 - Fixed monthly fee, for fixed costs of the water utility
 - Consumption fee €/m³
- Average fee for one household house is 4,83 €/m³ and for apartments 3,96 €/m³
- Average water consumption is 130 l/d/person, this means that monthly water bill is about 2 % of the households total income (4 persons, 2 working)
- In rural areas households pay directly their investment and operation costs

Finnish Water Strongholds

- Water and waste water treatment
 - Municipal, industrial
- Water efficiency <--> Energy and material efficiency, recycling
- Smart Water – combined water and ICT applications
 - Monitoring, measuring, wireless data transfer, modeling...
 - Water and wastewater treatment, network management
 - Water resources management, hydrometeorological services
- Integrated Water Resources Management
 - Good governance and cooperation with all stakeholders
 - Long-term planning and targets
 - Protecting water resources
 - Transboundary water resources management

Finnish Water Challenges

- Asset management
 - Rehabilitation, renewal and replacement investment funding gap is continuously widening, especially in WSS pipelines
 - Even in the bigger cities, the actual condition of the water and wastewater network is not known accurately enough
- Eutrophication of Baltic Sea
 - The Baltic Sea is one of the most polluted seas in the world
- Harmful substances
 - Organic harmful substances
 - Drugs