CURRENT STATUS IN WASTEWATER TREATMENT IN SERBIA

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1. INTRODUCTION

- Development of sanitary systems started primarily as a health measurement and not as an environmental concern.

- As the society developed, so did the need for resolving environmental issues as well.

- Differences between industrial and developing countries – ‘standard’ for today’s wastewater treatment plant.

- Cost – benefit analysis should be a means of reaching sustainable system even in developing countries.
Main problems in Serbia:

- **Degraded quality** of water bodies
- **Big percent** of population is not connected to the sewage system
- **Inadequate maintenance** of the old sewage systems
- **Lack of data** in some areas about the population connectivity
- **Discharge of the untreated wastewaters** even from the big cities into the water bodies
- **Unawareness of the population** about the environmental issues
- **Unsatisfying analysis** for the design of wastewater collection and treatment facilities (too much assumptions and small investment into the analysis part of the design).
Degraded quality of water bodies

• Quality control of surface and underground water is done in accordance with the Regulation for systematic testing of water quality by the Government of the Republic of Serbia

• 48% of 160 measuring profiles are in the fourth class (the worst), and many of them are even beyond any class.

• The situation with water quality is especially difficult where the recipients of wastewaters are used DTD channels.

• Inorganic pollution - small number of big polluters like Thermal Power Plants and Chemical Industry

• Organic pollution - about 40% from 30 big industrial polluters mainly agricultural complexes, sugar, beer and milk industries.
• **Population not connected to the sewage system**
  
  Connection of the population to the sewage network in European cities is usually more than 95%, while in the main city of Serbia, Belgrade it is 85%.

  Worse situation is in the rest of the country where AP Vojvodina has connectivity of 45% and Central Serbia without Belgrade only 37%.

  **Total percent** of population in Serbia connected to sewage network is 56%.

  If we compare urban and rural population it is obvious that rural areas are in a very bad situation, where the connection is only 9% while the connection in cities is 75%.

  Only 16% of the population is connected to some type of treatment (around 13% on the biological).
Inadequate maintenance of the old sewage systems

• Lack of investments and maintenance led to breakage of pipes and infiltration of polluted water and furthermore to degradation of environment.

• Typical example for this is degradation of water supply ‘Štrand’ in Novi Sad which supplies one third of the city population.

• Most of the sewage network, including the one in the biggest cities is built on the combined principle where municipal wastewater is collected together with rainwater, water from washing streets and other public areas (bad option due to constant change of quality and quantity of wastewater).
Lack of data in some areas about the population connectivity

• Unknown locations of old network and unknown number of connected population.

Discharge of the untreated wastewaters

• Untreated municipal and industrial wastewater, untreated landfill leachate, drainage water from agriculture and pollution from floodings and river navigation goes directly to water recipients.

• Big part of the settlements use water permeable septic tanks for their wastewaters, which influence ground waters but also minor surface water bodies.

• Industrial facilities are usually releasing their wastewaters to the municipal sewage without any previous treatment or directly to water bodies.
Unawareness of the population about the environmental issues

• The population is not environmentally educated and they often don’t understand the cause of their actions.

• Problem with inhabitants which don’t want to be connected to sanitary systems (example of Lake Palic).
Unsatisfying analysis for the design of wastewater collection and treatment facilities

• Design of sewage and wastewater treatment plants are usually done on the base of assumptions, literature and previous knowledge from other locations.

• Sewage and treatment system of wastewaters is a complex system which requires a lot of data about the climate, geology, geography about the specific location.

• Wastewater analysis and pilot plants are required to be able to provide a design for the sustainable system.

• Without this we have a huge problem with plants which are oversized, not working properly, have inadequate maintenance, or provide poor water quality.
<table>
<thead>
<tr>
<th>Location</th>
<th>Capacity</th>
<th>Treatment phases</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bač</td>
<td>13 000</td>
<td>1,2</td>
<td>Irregular maintenance and technical malfunction.</td>
</tr>
<tr>
<td>Bačka Palanka</td>
<td>-</td>
<td>1</td>
<td>Unsufficient capacity, technically outdated, it is not working and it doesn't fit for the future solution.</td>
</tr>
<tr>
<td>Horgoš</td>
<td>2 000</td>
<td>1,2</td>
<td>Unsufficient capacity, unstable and not sufficient quality of treated water</td>
</tr>
<tr>
<td>Novi Bečej</td>
<td>2 000</td>
<td>1,2</td>
<td>Unsufficient capacity, technically outdated, it is not working and it doesn't fit for the future solution.</td>
</tr>
<tr>
<td>Sombor</td>
<td>180 000</td>
<td>1,2</td>
<td>Operation with smaller capacity. Periodically disorders in the process of purification, because of the lack of prior treatment in some industries.</td>
</tr>
<tr>
<td>Stara Moravica</td>
<td>5 000</td>
<td>1,2</td>
<td>Technical disorders in the process of purification, because of the lack of prior treatment in some industries.</td>
</tr>
<tr>
<td>Vršac</td>
<td>90 000</td>
<td>1,2</td>
<td>Technically unstable due to the lack of prior treatment in some industries.</td>
</tr>
</tbody>
</table>
3. EVALUATION OF FINANCIAL RESOURCES NEEDED TO RESOLVE THIS PROBLEMATIC
<table>
<thead>
<tr>
<th>Population in urban area</th>
<th>Type of investment</th>
<th>Costs (€/capita)</th>
<th>Total (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 000 000</td>
<td>Sewage network</td>
<td>160</td>
<td>480.000.000</td>
</tr>
<tr>
<td>2 800 000</td>
<td>Wastewater treatment plants</td>
<td>220</td>
<td>616.000.000</td>
</tr>
<tr>
<td>Population in rural area</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 500 000</td>
<td>Sewage network and Wastewater treatment plants</td>
<td>528</td>
<td>1.848.000.000</td>
</tr>
</tbody>
</table>

- The data is calculated from the population census from 2011 and it shows that it would be necessary to invest 3 billion € in the next 15 to 20 years.
4. CONCLUSION

- In order to have a sustainable environment Serbia still needs to work on a lot of issues regarding to resolving the problematic of wastewaters.
- The later we start to resolve the constant degradation of our environment the harder it will be to find solutions, especially with the expected industrial growth.
- Industrial facilities must not only treat their wastewaters before discharge, but also to improve and modernize their production processes.
- Resolving problems must include data collecting and pilot projects in order to prevent having inadequate solutions which we have today.
- Monitoring and efficient control of treatment systems is the main part of properly maintained facility.
- Restoration and upgrading of facilities in these cases can be even bigger and more expensive problem and that is why we can’t allow ourselves to build and project solutions which are inadequate, unsustainable and not giving proper results, or to neglect the facilities that once worked properly.
Thank you for your attention