Felix STROE

President
Romanian Water Association

Innovative approaches in water loss management

According to the National Institute of Statistics, in 2017, in Romania, 67.5% of the population benefited from the public water supply service. However, there are very large differences between urban and rural areas: *96.9% of the urban resident population is connected to the public water supply system, while in the rural area the percentage is 33.5%.*

With regard to the expansion of drinking water networks, significant increases were registered annually, in 2017 reaching an increase of 44.5% compared to 2008. Despite the continuous expansion, in most supply systems there are still networks that have exceeded their service life and are having significant losses due to their advanced wear status.

Starting from these concrete data, in order to increase the operational and financial efficiency of the water companies, a series of innovative measures are required, with the main purpose to reduce water losses. The essential condition is that all costs generated by the implementation of these measures will be recovered in the shortest possible time. Also, the measures applied in the field of water loss management have maximum efficiency if the water supply system is very well known and if there is an exact measure of the water flows entering the distribution network and the flows that generate income.

The Romanian water operators have started successfully implementing projects that will reduce the water losses, which we will detail:

- The performance-based project for reducing non-revenue water: the performance of the main water networks in terms of non-revenue water (NRW) and the level of infrastructure losses (ILI) is established, as well as the implementation of short, medium and long long-term plans for NRW reduction. The cost recovery will be done from the efficiency of the project.

- Detection of water leaks using satellite spectrometry, a technique based on spectral scanning of the ground using a satellite, analysis of collected data, use of mathematical algorithms to determine the spectral fingerprint of water lost from a pipeline and localization on a GIS basis of points in which are the indications of water loss. This method is successfully used by many water operators in Romania.

- Implementation of SCADA systems throughout the operator service area, especially in rural areas. The system faults are detected in real time and under these conditions the repair is done in a very short time. The correct operation of the water supply systems using SCADA results in the reduction of water losses, the reduction of energy costs, as well as the costs of the operating personnel.

Philip WELLER

Head of Technical Secretariat
IAWD – Danube Water Program

Water Loss - the topic of the *2019 South East European Region Conference hosted by ARA (Romanian Water Association)* is one of the most critical challenges facing water Utilities in the Danube Region. *IAWD, the International Association of Water Service Companies in the Danube River Catchment Area* has for the past 7 years worked together with the World Bank in managing a program of support for water utilities as part of the Danube Water Program. At the Danube Water Conference hosted by the Program, an updated State of the Sector report on the status of water services in the region was released and identified this topic as a key area of concern.

The report found, *"NRW continues to be a key challenge for most utilities, especially in non-EU member countries. The average NRW level in EU member states is 33 percent; it is 58 percent in candidate and potential candidate countries and up to 43 percent in non-EU countries."* Water Loss is a significant percentage of the NRW recorded and within the Danube region only *Austria and the Czech Republic are* reportedly *reaching international good practice with less than 25 percent of NRW.*

Much work remains to be done to address *Water Loss* and *IAWD* is very pleased that *ARA* is focusing the *Regional Conference* this year on this topic.

As part of a regional effort to address this problem *IAWD* has, in cooperation with water utility associations in the region, developed a capacity development program targeted at assisting utilities in reducing water loss and Non-Revenue Water under the Danube Learning Partnership *(D-LeaP)*. The Non Revenue Water program has involved hands on training for water operators in leak detection and in managing the network in a manner to reduce *Water Loss*. This program is one of a series of CD initiatives that *IAWD*, and the regional Water Utility Associations, have developed together to strengthen the capacity of persons in the water sector to address key issues of importance.

Addressing the issue of *Water Loss* is a central step in creating an efficiently and effectively run utility. By reducing water loss important gains can be made in water utility efficiency and effectiveness.

Smart Policies, Sound Utilities and Sustainable Services – this is the motto of the Danube Water Program - and we look forward to the opportunity for Regional discussions in Bucharest about *Water Loss* at *the ARA Water Loss Conference* that can contribute to making this triumvirate possible in the Danube region.

Ion TOMA

Vice-president
Romanian Water Association

I attended every edition of this Forum and every time I had the opportunity to make a profitable exchange of ideas related to innovations and best international practices, taking into account the urgent challenges and needs faced by the water sector in Romania.

In my opinion, the main quality of this event is the degree of exposure of various strategies related to a rational and an efficient water management, the improvement of technical and managerial performance of the sector, and, as well, a profound, professional approach of challenges encountered when implementing the environmental requirements.

It goes without saying that everyone needs to have access to a clean and good quality water, but during my long activity in this sector I witnessed the development and expansion of great communities that nowadays are still supplied with surface water, and their unadequately treated wastewaters being discharged downstreams, directly into the water supply source of other localities.

I have found that, in some cases, there was also a lack of interest for groundwater. Although the destructive effects are not observable with the naked eye, the quality of these waters has been continually degraded as a result of pollutants infiltration into aquifers. Irresponsible actions lead to situations when water wells, in entire areas of Romania, became completely unusable because groundwater in those areas is loaded with nitrates.

Although, at declarative level, no one questions the importance of drinking water, we often forget the true value that water has for survival, both as a drinking resource, but also as a resource needed by industry and agriculture. Objectives vary according to how much water can be saved and the available environmental resources. However, changes are needed everywhere as to ensure the amount of water needed to maintain a safe ecosystem in the region. All indicators suggest that we need to change our behavior, that we need to develop better technologies and invest in expanding and developing networks in rural areas, even if this means a significant increase in costs. EU Member States are already working to comply with the existing directives on drinking water quality and flood risk control.

Anyway, I remain optimistic because I trust our ability to get acquainted with the new requirements met on the renewable energy markets, related to sustainable development and energy efficiency projects, and our ability to build the premises of a professional expertise in the field of emission of greenhouse effect gases *(with strict internal rules for the reducing of carbon footprint)* and, in general, the ability to comply with the EU's environmental standards.

For a greener and more sustainable Europe, the European Union and the national governments have set clear targets to guide environmental policy by 2020 and have defined a vision for the 2020-2050 period by supporting research programs, regulations and financing possibilities.

All these are, in fact, challenges for us, the drinking water producers and distributors of Romania, and I consider as a priority the increasing of absorption rate for non-reimbursable funds alloted under the 2014- 2020 LIOP Programme, and, as well, as regards the next program period.

I wish great success to all participants involved in the Danube Eastern Europe Regional Water Forum!

Bambos CHARALAMBOUS

Chair of the Scientific Committee of "Water Loss 2019"
Fellow of the International Water Association

The *Water Loss Specialist Group (WLSG)* of *the International Water Association (IWA)* holds conferences every 2 years as a major event of the Specialist Group. The event was held in Cape Town, South Africa at the beginning of May 2018, a period when the city was running out of water due to prolonged drought and was reporting less than 100 days left before it ran out of water. Many WLSG members were actively involved together with the city's water managers and staff who worked tirelessly and managed to avoid the catastrophic situation of the pipes running dry through the application of the methodologies and practices of the WLSG. In June 2020 the WLSG holds its biannual conference in Shenzhen, China and this will be a very exciting time and one that we are all looking forward to. In the year between the biannual conferences the WLSG holds regional events and we are very pleased and proud that the next regional event is in Bucharest, Romania, hosted by the *Romanian Water Association*.

The Southeast Europe Regional Conference *"Water Loss 2019"* was brought to Southeast Europe by the WLSG to address the pressing need for improved water utility efficiency in this part of the world. The Conference will be part of a series of events organised by the *Romanian Water Association* within the *Danube Eastern - Europe Regional Water Forum*. *"Water Loss 2019"* is intended to present and discuss the latest developments, strategies, techniques and applications of international best practices in NRW Management. The event shall focus on furthering knowledge on water loss control and management as well as in assisting water supply managers and professionals in addressing such losses.

The proposed themes cover innovative aspects of NRW, such as Smart Water Networks, Relevant IT Solutions, Performance Based NRW Management Contracts, Water Utilities Internal Reform, Regulatory Aspects, Organizational and Institutional Issues and many more. A total of 47 abstracts were submitted from which 36 were accepted for oral presentation based on a critical review by the Scientific Committee.

The conference will include a pre-conference Workshop on *"NRW Key Performance Indicators"* to be held on Sunday, 22 September 2019, which will address the importance of performance indicators in water loss reduction and control. The oral presentations will take place during the Technical Sessions to be held on Monday 23 and Tuesday 24, September 2019. More details can be found at the conference website http://www.waterloss2019.org.

We look forward to welcoming you in Bucharest!!

Stuart HAMILTON

President of IWA - Water Loss Specialists Group

The International Water Association (IWA) Water Loss Specialist Group (WLSG) with its 2000 dedicated members represented from over 40 countries promotes the understanding of *Non Revenue Water (NRW)* and works with countries to reduce this ensuring the people have better availability to clean drinking water and the ambition around the world to remove any intermittent supply and ensure everyone can have a 24/7 supply period.

This is of course a great ambition however if we never promote this then we never may never achieve a worldwide 24/7 dream as leaving the water system alone without proper management only means it will eventually fail. The distribution system requires constant attention and planned renewal programs to ensure old mains are replaced at the right and most effective time before they fail.

Ageing infrastructure and declining water resources are major concerns with a growing global population. Controlling *NRW* has therefore become a priority for water utilities around the world.

NRW is a word that is easily quoted and said and yet the true meaning of the words can be immense. *NRW* should not be took lightly as if ignored the significant and life changing consequences can occur such as water shortages, intermittent supplies or significant loss of revenue to the company. Reduction or dealing with *NRW* is a long-term plan of action that should not be took lightly and ensure the individuals, company and country are committed to make this long term reduction plan.

The reasons for reducing *NRW* have been well documented through the WLSG and its working groups has established several relevant guidelines, including the standard water balance and the management strategies on real loss reduction procedures which uses the four leakage control strategies to reduce real losses urban water distribution systems, namely:

1. *Active leakage control;*
2. *Pressure management;*
3. *Speed and quality of repairs;*
4. *Targeted renewal of infrastructure.*

These have to be balanced in order to achieve the most cost effective leakage programme which reduces leakage to an economically, environmentally and socially acceptable level. This approach is well tested and has been applied around the globe with extremely positive results for utilities. These WLSG methodologies and strategies have a global application and represent what could be termed "*best practice*" in the area of water loss control management. They have been implemented successfully in countries in *Europe, North and South America, the Caribbean, Australia, New Zealand, Pacific Islands, South Africa and South East Asia.*

These 4 pillars of building a successful plan are imperative along with the process and benefits of fully understanding your system, the importance of having an auditable water balance and most important to present your findings using the correct performance indicators.

To deal with *NRW* in an effective manner, particularly from networks in water scarce areas, water utility managers are increasingly turning to technology to reduce costs, increase efficiency and improve reliability. Companies that continuously invest in technology and innovation should see a positive return on investment in terms of improving daily operations and collection and analysis of network data for decision making and forward planning.

Ioan BICA

Vice-president Romanian Water Association

The progress of the human society can be assured/maintained in the medium and long term only if it is sustainable, respectively if it looks more closely at the management of natural resources and to the emissions of pollutants and waste, of whatever kind they are. After more than 30 years of the adoption of the concept of sustainable development, we find that its results are still unsatisfactory. Thus, the amount of natural resources exploited (*iron ore, fossil energy resources, non-metalliferous minerals, biomass)* has increased from 40 billion tonnes, in 1980 to 60 billion tonnes, in 2005. For every inhabitant of the European Union it is exploited annually almost 15 tons of materials, generating, on average, over 4.5 tons of waste.

It is increasingly obvious that new efforts and new approaches are needed within the overall development plans so that sustainable development wishes are more rigorously implemented so that the overall balance of the planet is maintained.

Referring to water, it is noted that in the last century the consumption of this resource has increased twice more, compared to the numerical growth of the population. If we add to this the impact of climate change on the balance and availability of water resources, our concern for better water management must become more intense and more efficient.

The main themes of the current stage of our development are called upon to ensure the protection, conservation and improvement of natural capital, improving the sustainability of cities, promoting more firmly the green economy, with low carbon dioxide emissions and resource efficiency.

In this context and in pursuit of these goals, the theme of this year's International Conference organized by *ARA* was established, under the aegis of the *International Water Association (IWA)* within the *Danube Water Forum - Eastern Europe*. The *Water Loss 2019* conference offers the possibility of a wide-ranging dialogue, an exchange of ideas on current innovations, respectively of national and international best practices in the water loss management sector. The problem of water loss management is not only technological and economic but also social, environmental, comfort and ultimately safety in satisfying the needs of the users, no matter from what field they are.

Through the high scientific level of the works accepted within the conference, through the topics addressed, through the professionalism of the participating specialists, this year's conference is positioned at a high scientific level, promoting many novelty elements, extremely useful for the community of Romanian specialists. The conference brings to the attention of operators, designers, researchers, water professionals a number of new sustainable technologies, but also high-performance equipment and materials, management solutions for improving urban water management, and reducing losses in urban water infrastructure.

I wish to all of the participants at this conference a success!

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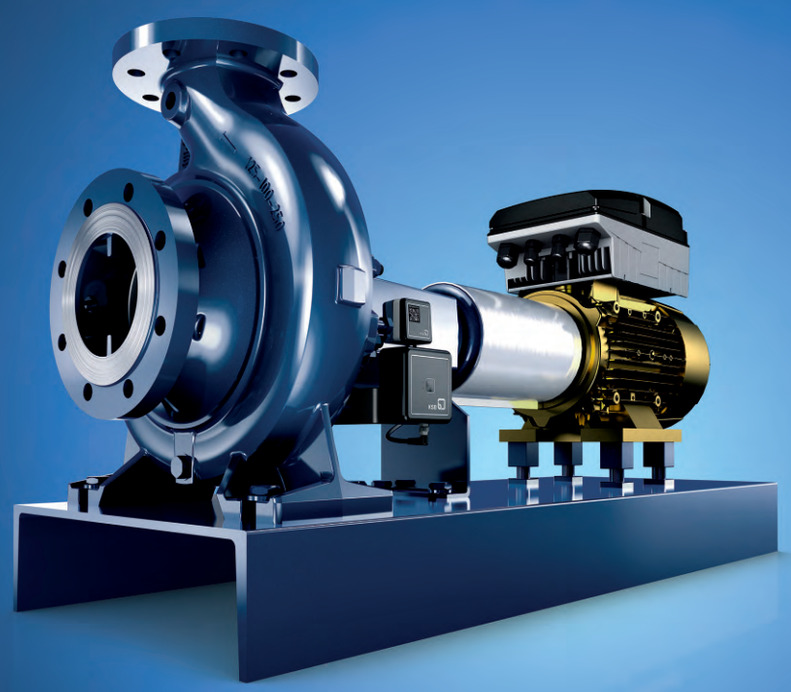

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