

In addition to some already used procedures, the Water Balance also includes several new indicators which independently, or in their mutual relations, define the water loss value.

Non-revenue Water as Volume

It is being defined as a percentage in proportion to the water volume supplied into the system on an annual level. It can be simply calculated from the Water Balance. It serves only as a financial indicator of general situation.

Non-revenue Water as Cost

It is being defined as non-revenue water volume in proportion to the annual water system operation costs and includes different unit costs for all non-revenue water components.

Apparent Losses/connection/day

They are being defined as a volume of all apparent losses per customer connection per day. They represent a highly significant indicator that must be calculated or assessed.

Real Losses as Percentage

They are being defined as a percentage in proportion to the volume of water supplied into the system. They are indicators of inefficient use of water resources. This indicator is not suitable for the assessment of distribution system efficiency.

Real Losses/connection/day

They are being expressed in liters per connection per day. They represent a very good operational indicator for the definition of goals relating to the real water loss reduction.

UARL ♦ Unavoidable Annual Real Losses

This indicator is labeled as UARL (Unavoidable Annual Real Losses) in the literature issued by IWA and AWWA and is defined as a theoretical reference value representing the lowest possible technical level of water leakage from a pipeline which is possible to reach by using best world technologies available nowadays.

It is not recommendable that the ViKs aim to reduce the value of this indicator except in cases when the water tariff is extremely high.

This indicator represents one of the two key indicators for the calculation of ♦ILI♦ ♦ infrastructure leakage index.

UARL is calculated based on the following formula:

arial, helvetica, sans-serif; font-size: 12pt;">UARL = (18 x $\frac{L}{m} + 0,8 N + 25 \times \frac{L}{p} \times P$) x P

where:

- L network pipeline length (km)
- N total no. of connections in the system,
- p total length of service connection pipes passing through the private property,
- P average pressure value in the system.

CARL ♦ Current Annual Real Losses

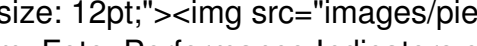
CARL (Current Annual Real Losses) represents volume of water being lost through all physical defects in the system, detected or not detected ones, or due to the mistake made by the operator (e.g. reservoir overflows). CARL/UARL ratio defines the value of ILI.

ILI ♦ Infrastructure Leakage Index

ILI (Infrastructure Leakage Index) represents an indicator defining the quality of water system operation (maintenance, repairs, rehabilitation) needed for the real loss (leakage) control. It mathematically represents a ratio between current annual real losses (CARL) and unavoidable annual real losses (UARL).

Low ♦ ILI ♦ indicates that the Water Supply Company managed to reduce system leakages to the UARL level or to the theoretical low limit which could be reached.

Since ♦ ILI ♦ is a non-dimensional indicator, it represents a leading indicator for benchmarking water system leakages of one Water Supply Company with the same of other Water Utilities worldwide.

 Foto: Performance Indicators calculation using CalcuLEAKator software.