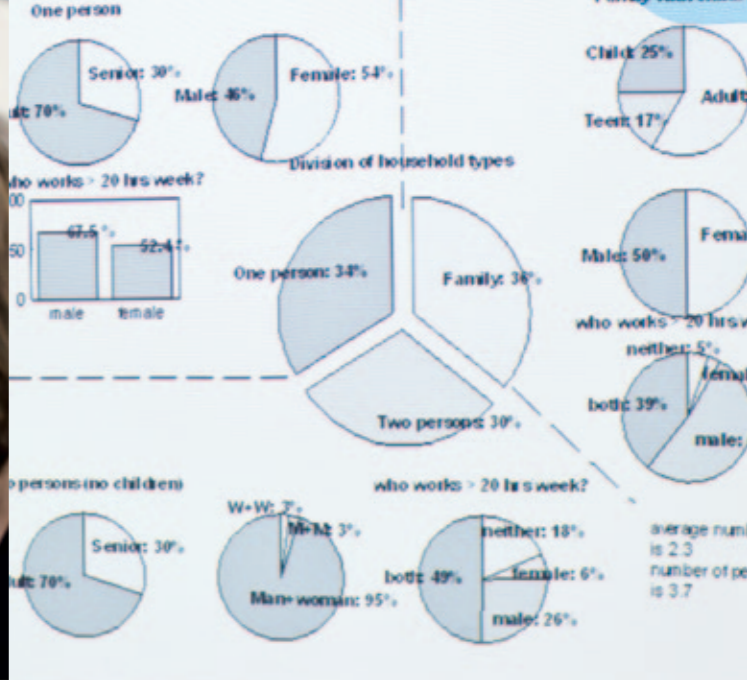


SIMDEUM®

The smart assistant
for designing drinking
water installations



KWR Watercycle Research Institute

KWR Watercycle Research Institute employs experts in a wide variety of aspects of the water cycle. It is the main actor in the joint research programme of the Dutch water companies. KWR assists water companies in effectively answering their research questions, and in converting scientific answers into practical solutions that are actually implemented in water practice. KWR Waterware® is the result of 40 years of joint research experience in close collaboration with our clients.

KWR Waterware®

KWR's research focuses on four important themes: Healthy, Sustainable, Advanced and Efficient water. The research regularly results in proof-of-concept software, which is then further developed into software tools under the banner of KWR Waterware®. This brochure provides information on one particular pilot software programme: SIMDEUM®. Would you like to know what KWR via SIMDEUM® can do for you? Please contact our consultants via www.waterware.nl.

SIMDEUM®

The drinking water installation for a new home, apartment building, hotel or office can be designed more efficiently and sustainably if one can predict the building's water demand. SIMDEUM® is a new, proven tool that provides the designer with the possibility of making a sustainable, hygienic and energy-efficient drinking water installation without compromising water quality or comfort.

Introducing SIMDEUM®

Human behaviour is predictable. This is especially true for water use. In the morning most people will flush the toilet and take a shower after they get out of bed. In the evening they will cook dinner and, before going to bed, will brush their teeth, flush the toilet and maybe take a shower. Even if they don't behave exactly the same way every day, their overall water use in a residential area, hotel or office follows a predictable pattern. SIMDEUM® (SIMulation of water Demand, an End-Use Model) combines these water use behavioural patterns with the knowledge of types of showers, toilets and washing machines. In this way it models water use on a micro scale, for residential and non-residential buildings. There is no need to physically measure the water flows. Actual water demand varies from hour to hour, from day to day, and is different for each home, hotel, office, etc. Detailed flow measurements have shown that

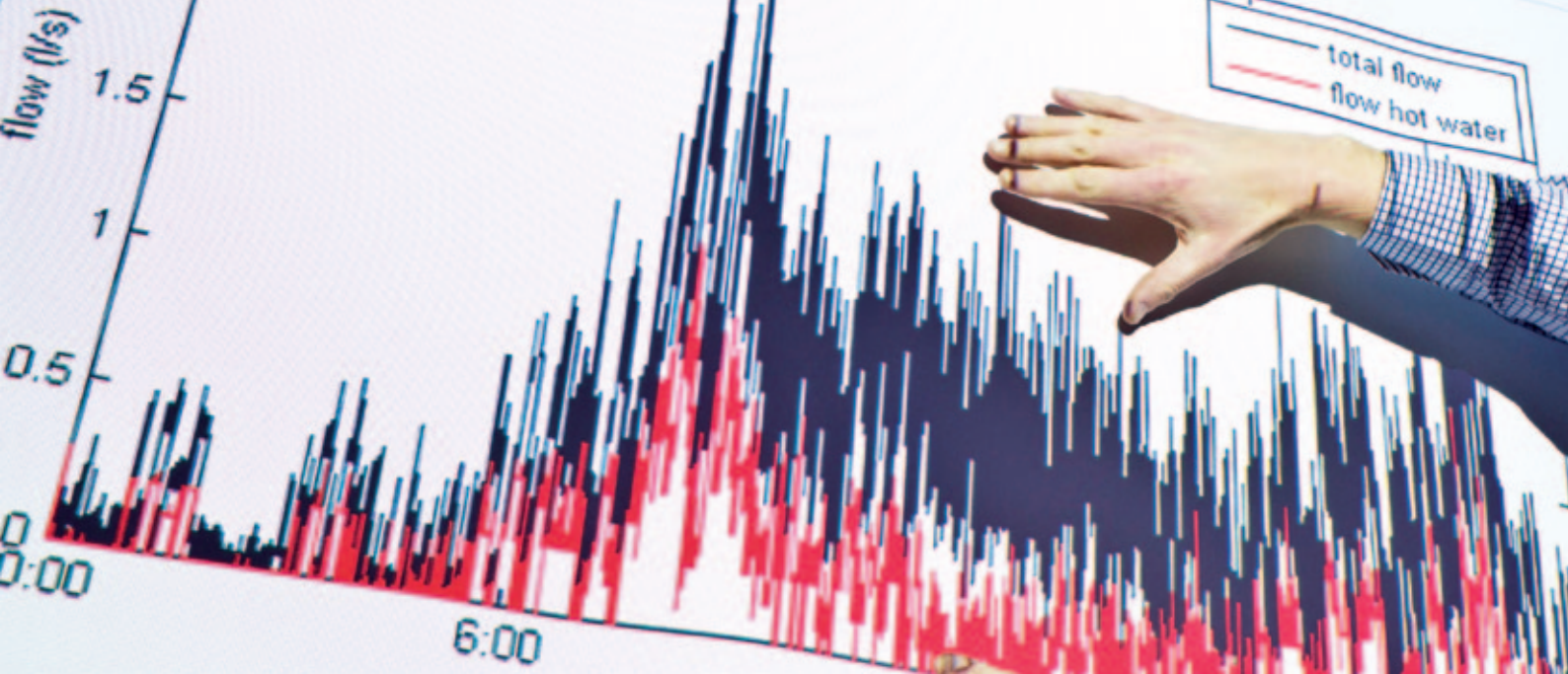
Above | Several types of household compositions are considered in SIMDEUM®.

SIMDEUM® predicts actual water demand remarkably well in terms of average daily demand and water-use patterns and of demand variability over time and between different buildings.

SIMDEUM® simulates realistic water demand patterns on a micro scale, per end use – for example a toilet, shower or tap. In this way it allows one to identify what the water is actually used for and, therefore, what temperature it needs to be at and what quality it should have. It also provides information on the temperature and quality of the wastewater which will be discharged by the building into the sewage system. SIMDEUM® produces a whole range of realistic water demands, from days of minimum water use to situations of maximum water use. From this range of possible water demand, one can extract relevant design parameters, such as maximum flow and maximum hot water use in a particular time frame. Having realistic water demand patterns before a new home, apartment building, hotel or office is built, provides the designer with the possibility of making a sustainable, hygienic and energy-efficient drinking water installation without compromising water quality or comfort.

The SIMDEUM® pilot

Working together with a KWR consultant, you will be able to identify the appropriate SIMDEUM® input parameters for your particular purposes. These might include specific behavioural components relevant to a certain country or region, or to a specific type of building. In addition, you will be identifying relevant design parameters; for example the maximum instantaneous flow, for sizing pipes, or the maximum hot water use over 10 minutes and 2 hours, for sizing the hot water tank. KWR will run the simulations with SIMDEUM® and extract the design parameters. On this basis you will be in a position to produce a more sustainable design of the drinking water installation for a particular building in a specific country or region.



Above | Total (black line) and hot (red line) water demand of a hotel.

References

Uneto-VNI has used SIMDEUM® to develop standard design parameters for water installations in new buildings. Drinking water company Oasen has used SIMDEUM® to study the effect of using a separate hot tap water distribution network.

Wageningen University & Research centre is employing SIMDEUM® to study the possibility of using alternatives to drinking water, such as grey water and rain water, for toilet flushing.

For further scientific background information, see: 'Simulating residential water demand with a stochastic end-use model'. *Journal of Water Resources Planning and Management*, 136(1), 19-26, and 'Simulating non-residential water demand with a stochastic end-use model'. *Journal of Water Resources Planning and Management*, 137(6), 511-520

Contact: Ilse Pieterse
ilse.pieterse@kwrwater.nl
 +31 (0)30 60 69 672

Contact: Mirjam Blokker
mirjam.blokker@kwrwater.nl
 +31 (0)30 60 69 533

Contact

Would you like to learn more about KWR Watercycle Research Institute and KWR Waterware®? Then contact us.

Postal address

KWR Watercycle Research Institute
 PO Box 1072
 3430 BB Nieuwegein
 The Netherlands

T +31 (0)30 60 69 511
 F +31 (0)30 60 61 165
 E info@kwrwater.nl
 I www.kwrwater.nl
 I www.waterware.nl
 @KWR_Water