<table>
<thead>
<tr>
<th>Time</th>
<th>Workshop</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:00</td>
<td>WORKSHOP 1</td>
<td><strong>DEVELOPING A PATHWAY TO A DIGITAL FUTURE</strong>&lt;br&gt;Cor Merks, Francisco Arregui De-La-Cruz, Thorkil Bartholdy Neergaard&lt;br&gt;Static water meters provide a large amount of useful data. The use of this meter data to its fullest extent allows water operators to develop and operate a digital value chain. Frontrunner operators worldwide did already create added value for the utility and their customers and stakeholders. Other water operators are at the start of their digitalization journey. These water operators might be inspired by successful residential static water meter implementation projects or are hesitant when considering an unknown impact on their organisation. The workshop will provide the participants the full range of insights gained in a variety of countries so far. The panelists together with the participants will examine the opportunities and challenges that are related with the value creation process that is part of the implementation of static meters and the use of water meter data.</td>
</tr>
<tr>
<td>13:30</td>
<td>WORKSHOP 2</td>
<td><strong>COMPARING LEVELS OF WATER LOSS INTERNATIONALLY</strong>&lt;br&gt;Stuart Trow, David Pearson, Alan Wyatt, Joerg Koelbl&lt;br&gt;The aim of the workshop is to discuss the level of water loss in water supply organisations around the world and the measures used to assess and compare those levels. The presenters have been meeting regularly for several months on an initiative to collect water loss data from around the world and to consider the various indicators for making comparisons. As interest in water loss management grows, and targets are being set in many countries often based on comparative KPIs, it is important that water suppliers, consultants, and especially regulators and governments understand the relative merits of each measure. It is also necessary to have a better assessment of water loss levels internationally at a time when there is increased focus on this precious resource.</td>
</tr>
<tr>
<td>15:30</td>
<td>WORKSHOP 3</td>
<td><strong>UNLOCKING CLIMATE FINANCE FOR WATER LOSS REDUCTION</strong>&lt;br&gt;David Ehrhardt, Steve Cavanaugh, Gregory Kpegli&lt;br&gt;Billions of dollars of climate finance are available. Water loss reduction mitigates greenhouse gas emissions while boosting resilience to climate change. How can water loss reduction projects benefit from climate finance? To answer that question, we will explore the centrality of robust measurement in making a credible case for climate finance and review the various types of climate finance on offer, providing you with practical information with which to craft strategies to finance your loss-reduction projects.</td>
</tr>
<tr>
<td>20:00</td>
<td>WELCOME COCKTAIL</td>
<td>at KURSAAL (<a href="http://www.waterloss2024.org/social-events.htm">www.waterloss2024.org/social-events.htm</a>)</td>
</tr>
</tbody>
</table>
## NRW ASSESSMENT 1
**Chair:** Dewi Rogers

**Presenter:**
- **Francesc J. Water loss knowledge hub development**, NSW Australia
- **H. Pernille**, HOLLAND
- **David**, PORTUGAL

**Title:**
- **A business case for implementation of smart metering**
  - Stuart Dewi, USA
  - Kibum Reid, SPAIN
  - Bruno Tugba, FRANCE

**Country:**
- **USA**
- **USA / BRAZIL**
- **PORTUGAL**

**Room:**
- **Room 2**
- **Room 3**

**Time:**
- **10:50-11:00**
- **11:10-11:30**
- **11:30-11:50**
- **11:50-12:10**

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## NRW ASSESSMENT 2
**Chair:** Joerg Koelbl

**Presenter:**
- **Reinhard**, Title
- **Johana Beltran**, Good practices in non revenue water at Veolia Colombia, COLOMBIA
- **Avnaila Gaccione**, The EU recovery plan - the opportunity to lead Italy to a full digitalization in the water industry and a NRW reduction, ITALY

**Title:**
- **A critical review of water losses control regulation in Turkey**
  - Johana Beltran, COLOMBIA
  - Avnaila Gaccione, ITALY

**Country:**
- **COLOMBIA**
- **ITALY**

**Room:**
- **Room 2**
- **Room 3**

**Time:**
- **13:30-13:50**
- **13:50-14:10**
- **14:10-14:50**
- **14:50-15:10**

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## WATER LOSS PERFORMANCE INDICATORS
**Chair:** Joerg Koelbl

**Presenter:**
- **Daniel Zipper**, Challenges in applying the IU as a water loss indicator to water utilities in Rhineland-Palatinate, GERMANY
- **Joxemi Telleria**, Indicators and work lines to improve performance in municipalities of the Consortium of A. de Gipuzkoa, SPAIN

**Title:**
- **Evaluation of DMA sectorisation criteria: Case study in Helsinki**
  - Daniel Zipper, GERMANY
  - Joxemi Telleria, SPAIN

**Country:**
- **GERMANY**
- **SPAIN**

**Room:**
- **Room 2**
- **Room 3**

**Time:**
- **15:30-15:50**
- **15:50-16:10**
- **16:10-16:30**
- **16:30-16:50**

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## EXPRESS SESSION - DIGITALIZATION, AI AND ML APPLICATIONS
**Chair:** David Pearson

**Presenter:**
- **Nicole Kinsman**, Stainless steel service lines for best total cost of ownership, BELGIUM
- **Kibum Reid**, Strategic leak management in water distribution network using varying coefficient binary regression model, USA

**Title:**
- **Developed a machine learning-based model to predict the condition assessment grade of water pipes**
  - Nicole Kinsman, BELGIUM
  - Kibum Reid, USA

**Country:**
- **BELGIUM**
- **USA**

**Room:**
- **Room 1**
- **Room 2**

**Time:**
- **17:30-17:50**
- **17:50-18:10**
<table>
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<tr>
<th>Presenter</th>
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<tbody>
<tr>
<td>Nele Philips</td>
<td>BELGIUM</td>
<td>Utility Water De Groep explores the use of alternative methods for leak detection</td>
<td>AUSTRIA</td>
<td>Tony Wagener</td>
<td>The Florida Water Loss Program: Continuing the Trend of Voluntary Water Training and Technical Assistance Programs USA</td>
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<tr>
<td>Kelvin New</td>
<td>MALAYSIA</td>
<td>Pressure sensitive monitoring and leak detection system on trunk mains</td>
<td>SPAIN</td>
<td>Marco Fantazzi</td>
<td>The Italian Association of Non-Destructive Testing (AIPN) and the certification of personnel engaged in Leak Detection ITALY</td>
</tr>
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<td>Joseph Butterfield</td>
<td>UK</td>
<td>Application of MI to improve leak detection and localisation using acoustic sensing in high noise environments</td>
<td>GERMANY</td>
<td>Ayse Mutlu</td>
<td>Capacity Building of the Turkish Municipalities for Water Losses Management TURKEY</td>
</tr>
<tr>
<td>Stuart Trow</td>
<td>UK</td>
<td>Background leakage - What is it?</td>
<td>SINGAPORE</td>
<td>Jamie Peterson</td>
<td>Capacity Building on Non-Revenue Water Reduction Projects: Challenges and Opportunities UK</td>
</tr>
<tr>
<td>Martin Duff</td>
<td>UK</td>
<td>A method for leak detection to reduce the global water loss</td>
<td>COLOMBIA</td>
<td>Fabio Gazzon-Contreras</td>
<td>Risk allocation in NRW performance-based contracts COLOMBIA</td>
</tr>
<tr>
<td>Jonathan Jacobi</td>
<td>ISRAEL</td>
<td>Drought Resiliency: Sensitive Drinking Water Supply in Northern Italy with Satellite Leak Detection</td>
<td>SPAIN</td>
<td>Pedro Ramalho</td>
<td>AGS’s journey through the implementation of a Performance Based Agreement in Romania to reduce non-revenue water SPAIN</td>
</tr>
<tr>
<td>Meitak Brakerje</td>
<td>INDIA</td>
<td>Robotic Leak Detection Technology For Water Distribution Pipelines</td>
<td>SPAIN</td>
<td>K. Ashok Natarajan</td>
<td>The Transformation of Chennai Metro Water towards Reduction of NRW and increase in cost recovery through Smart Metering and services INDIA</td>
</tr>
<tr>
<td>Thijs Laeslriet</td>
<td>BELGIUM</td>
<td>Fiber optic sensing: leak detection method, asset management tool, digital connectivity solution, all of them?</td>
<td>UK</td>
<td>Juan Escobar</td>
<td>Towards a comprehensive definition of water loss reduction SPAIN</td>
</tr>
<tr>
<td>Jo Parker</td>
<td>UK</td>
<td>The hole truth</td>
<td>KOREA</td>
<td>S. Kanelloupoli/ S. Marco Mambala</td>
<td>Obtaining sustainable key results for NRW reduction projects: A practical experience from Dar Es Salam, Tanzania KOREA</td>
</tr>
<tr>
<td>Dooi Kim</td>
<td>KOREA</td>
<td>Residual life assessment using 3D profiles and structural analysis</td>
<td>SPAIN</td>
<td>Franccis Figueroes</td>
<td>Achievements on NRW reduction: 2 detailed use cases FRANCE</td>
</tr>
<tr>
<td>Gerald Gangl</td>
<td>GERMANY</td>
<td>Multi utility risk-based asset management</td>
<td>CROATIA</td>
<td>Victor Pelin</td>
<td>How can AI DMAs, fiber optics, pressure management and smart hydrants help us reach Il2=2 by 2028? SWEDEN</td>
</tr>
<tr>
<td>Andrea Fargas</td>
<td>SPAIN</td>
<td>Asset management of large pipes with a Digital Twin</td>
<td>SPAIN</td>
<td>Jorge Helmbrecht</td>
<td>How a British utility improved network management by integrating data from 6,000 sensors into a single platform SPAIN</td>
</tr>
<tr>
<td>Ken Goraya</td>
<td>AUSTRALIA</td>
<td>Service connections: The weakest link in the water distribution network</td>
<td>MEXICO</td>
<td>Carmen Narvorros</td>
<td>Transforming IWS supply for equitable and efficient service in Chihuahua MEXICO</td>
</tr>
<tr>
<td>Filip Vancolle</td>
<td>BELGIUM</td>
<td>How De Watergroup’s people in the field prioritize pipeline replacement</td>
<td>SPAIN</td>
<td>Aurelie Chazerain</td>
<td>Achieving High Performance in Water Networks: Case studies of AQUANESC Network and Nuove Acqua Network FRANCE</td>
</tr>
<tr>
<td>Tara Cunha</td>
<td>PORTUGAL</td>
<td>Porto’s Three-Step Campaign – An integrate strategy to reduce non-revenue water</td>
<td>FRANCE</td>
<td>Elsa Henning</td>
<td>Spatial characterization of the occurrence of fraud in the public water supply system in Joinville, Southern Brazil BRAZIL</td>
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<tr>
<td>Taehyeon Kim</td>
<td>KOREA</td>
<td>A proactive asset management approach through optimizing the diagnosis decision-making of water pipe networks</td>
<td>SPAIN</td>
<td>Panagiotis Dimas</td>
<td>Estimating water losses and designing reduction strategies in large water supply systems: The case of Athens GREECE</td>
</tr>
</tbody>
</table>

**ROOM 1**

**LEAK DETECTION 1**

- Chair: Stuart Trow


- Kelvin New: Pressure sensitive monitoring and leak detection system on trunk mains.

- Joseph Butterfield: Application of MI to improve leak detection and localisation using acoustic sensing in high noise environments.

- Stuart Trow: Background leakage - What is it?

**TECHNOLOGY & INNOVATION**

- Chair: Cor Merks

- Digital airvalve, the next part in the Smart Water Network.

- How Distributed Fiber Sensing complements existing leak detection technologies.

- High-Speed Transient Detection and Analysis to reduce Burst Rates and Extend Asset Life.

**TRAINING AND CAPACITY BUILDING**

- Chair: Mary Ann Dickinson

- The Florida Water Loss Program: Continuing the Trend of Voluntary Water Training and Technical Assistance Programs.

- The Italian Association of Non-Destructive Testing (AIPN) and the certification of personnel engaged in Leak Detection.

- Capacity Building on Non-Revenue Water Reduction Projects: Challenges and Opportunities.

---

**ROOM 2**

**LEAK DETECTION 2**

- Chair: Jamie Paterson

- Martin Duff: A method for leak detection to reduce the global water loss.


- Meitak Brakerje: Robotic Leak Detection Technology For Water Distribution Pipelines.

- Thijs Laeslriet: Fiber optic sensing: leak detection method, asset management tool, digital connectivity solution, all of them?

**DIGITALIZATION, AI & ML APPLICATIONS 1**

- Chair: Raul Navas Martinez

- A proactive asset management approach through optimizing non-revenue water.

- Porto’s Three-Step Campaign – An integrate strategy to reduce replacement.

- How De Watergroep’s people in the field prioritize pipeline analysis.

- Fiber optic sensing: leak detection method, asset management tool, digital connectivity solution, all of them?

**ASSET MANAGEMENT 1**

- Chair: Jo Parker

- The hole truth.

- Residual life assessment using 3D profiles and structural analysis.

- Multi utility risk-based asset management.

- Asset management of large pipes with a Digital Twin.

**DIGITALIZATION, AI & ML APPLICATIONS 2**

- Chair: Igor Dundovic

- How can AI DMAs, fiber optics, pressure management and smart hydrants help us reach Il2=2 by 2028?

- Evaluating sampling techniques for developing a failure prediction model in water pipeline networks.

- Improving leak detection by using digital twin (ArcGIS).

- Hydraulic modelling and machine learning for pressure management process.

- Grower, an open source tool to design dma and operational zoning to improve the NRW efficiency.

**INTERNATIONAL CASE STUDIES 1**

- Chair: Sofia Kanelloupolou

- Achievements on NRW reduction: 2 detailed use cases.

- How can AI DMAs, fiber optics, pressure management and smart hydrants help us reach Il2=2 by 2028?

- How a British utility improved network management by integrating data from 6,000 sensors into a single platform.

---

**ROOM 3**

**LEAK DETECTION 2**

- Chair: Jamie Paterson

- Martin Duff: A method for leak detection to reduce the global water loss.


- Meitak Brakerje: Robotic Leak Detection Technology For Water Distribution Pipelines.

- Thijs Laeslriet: Fiber optic sensing: leak detection method, asset management tool, digital connectivity solution, all of them?

**DIGITALIZATION, AI & ML APPLICATIONS 1**

- Chair: Raul Navas Martinez

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**ASSET MANAGEMENT 2**

- Chair: Cor Merks

- The hole truth.

- Residual life assessment using 3D profiles and structural analysis.

- Multi utility risk-based asset management.

- Asset management of large pipes with a Digital Twin.

**DIGITALIZATION, AI & ML APPLICATIONS 2**

- Chair: Francisco Arregui

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- Chair: Aurelie Chazerain

- How can AI DMAs, fiber optics, pressure management and smart hydrants help us reach Il2=2 by 2028?

- How a British utility improved network management by integrating data from 6,000 sensors into a single platform.

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**SESSIONS**

- **OPEN MEETING of the IWA WATER LOSS SPECIALIST GROUP**

- Activities, initiatives, discussions: Non-IWA WLSG members are MOST WELCOME

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**SALA DE CAMARA**

**Water Loss 2024**

**April 17-19, 2024**

**San Sebastian**

**FINAL PROGRAMME**

**Tuesday, 16th April, 2024**
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<tbody>
<tr>
<td>Kim Belmans</td>
<td>Smart DMA design with sub-dividing plan: Case Study</td>
<td>BELGIUM</td>
<td>Lai Kah Cheong</td>
<td>PUB’s Smart Water Analytics Platform – Enhancing Operational Efficiency via Reliable Digital Twin &amp; Advanced Analytics</td>
<td>SINGAPORE</td>
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<tr>
<td>Cecilia S. Chantada</td>
<td>Evolution of Management by DMA – Slow but convinced – From the Pilot to the Strategic Plan</td>
<td>ARGENTINA</td>
<td>Mutahar Ali Abdullah</td>
<td>Implementing a WN Management System to Support Shifting from Empirical Operation to Data-Driven Decision-Making</td>
<td>DENMARK</td>
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<tr>
<td>Tomislav Vitovski</td>
<td>Virtual DMA – implementation and leak detection in it</td>
<td>CROATIA</td>
<td>Jan Van Cappellen</td>
<td>Permanent non-DMA based leak localization in WDN, using integrated sensors in smart watermeters</td>
<td>BELGIUM</td>
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<tr>
<td>Carlos Calatayud</td>
<td>Active management of drinking water supply systems through multi-agen systems (MAS)</td>
<td>SPAIN</td>
<td>Ramon Dolz</td>
<td>NRW control and DMA management through AMI/AMR integration with SCADA</td>
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<tr>
<td>Kate Stanton-Davies</td>
<td>The Power of NIL</td>
<td>UK</td>
<td>Yaron Geller</td>
<td>AMR and water Utilities - technology leads change in management</td>
<td>ISRAEL</td>
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<td>Alexandra Aldea</td>
<td>A case study of pressure management in over-pressured supply system – evolution of performance indicators</td>
<td>ROMANIA</td>
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<td>Reduction of NRW with smart metering in Canal de Isabel II</td>
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<td>David Sánchez</td>
<td>Optimizing Pressure Management in Intermittent Water Supply Systems</td>
<td>MEXICO</td>
<td>José Delgado</td>
<td>Business intelligence as a driver of digital transformation for ANC reduction</td>
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<tr>
<td>Eva Martinez</td>
<td>Pressure transient management: Global trends, business case and introduction to a new global partnership program</td>
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<td>Andross Pérez</td>
<td>Valencia Case Study: advanced water efficiency management through technology</td>
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<td>Stuart Stapely</td>
<td>The Difficulties of Pressure Management and How to Overcome Them</td>
<td>AUSTRALIA</td>
<td>Jinseok Hyung</td>
<td>Development of optimal WDNs design method using genetic algorithm and reliability analysis</td>
<td>KOREA</td>
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<td>Eduardo Bulhoes</td>
<td>Evaluating the best pressure efficiency point</td>
<td>BRAZIL</td>
<td>Arsenio Mata</td>
<td>Experience in reducing commercial losses in the water supply system of Maputo Metropolitan regions</td>
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<tr>
<td>Giuliano Ceseri</td>
<td>An innovative approach for quick leakage detection and real-time adaptive pressure control in a PMZ</td>
<td>ITALY</td>
<td>M. Clemente Ulicos</td>
<td>GD Smart Meter Networks Evolution Since 2006</td>
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<tr>
<td>Carmen Sánchez</td>
<td>Networks 2.0: sensorization, advanced pressure regulation and energy efficiency in the city of Valencia</td>
<td>SPAIN</td>
<td>Luis R. Gravina</td>
<td>Improving the operational management of water supply systems through GIS integrated with hydraulic modeling</td>
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<td>Roland Liemberger</td>
<td>GO Smart Meter Networks Evolution Since 2006</td>
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<td>Adolfo Cuesta</td>
<td>Efficiency in the water cycle through Asset management systems</td>
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<td>Ana Ortega</td>
<td>Control valves for NRW reduction and hydraulic network protection</td>
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<td>Zhub Sha</td>
<td>Feature study of leak-induced vibration</td>
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<td>Ambrose Muhu</td>
<td>Thorough assessment of NRW for an effective, data driven campaign against water losses</td>
<td>KENYA</td>
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<td>Olgierd Wargowski</td>
<td>How the technology is helping to improve leak detection process</td>
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<td>Liy Gutermann</td>
<td>Europe is finally deploying the necessary funds to act on high water loss rates</td>
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