On-Demand Water Pressure Adjustment

The Demand Driven Distribution (DDD) project addresses the critical challenge of water loss and inefficiency in municipal water distribution systems. In the United States alone, over 2 trillion gallons (approximately 7.6 billion m^3) of treated water are lost annually because of aging infrastructure, leaks, and inefficient pressure management. These losses result in billions of U.S. dollars of financial strain for utilities and increased environmental impact. The DDD was developed to combat these issues by dynamically adjusting water pressure based on real-time demand, thereby reducing pipe bursts, leaks, and energy consumption. The system has been successfully implemented in cities like Skagen, Denmark, where it has demonstrated measurable improvements in water conservation, operational efficiency, and customer satisfaction.

- **REDUCE**
- **RECOVER**
- **REGENERATE**

- **BROOKSHIRE, TEXAS, USA**
- **WASTEWATER**
- **INDUSTRIAL**

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CHALLENGES FACED

Implementing Demand Driven Distribution (DDD) often requires a robust supporting infrastructure. For instance, in municipalities that do not utilize booster systems to pressurize their distribution networks, DDD may not be a suitable solution. Additionally, some utilities may resist adopting DDD because of entrenched development practices, as the approach often demands significant cultural and structural changes.

TECHNOLOGIES & SOLUTIONS USED

Demand Driven Distribution utilizes a combination of smart sensors, cloud-based analytics (Microsoft Azure), and advanced control algorithms to optimize water pressure in real time. Remote pressure sensors are installed at critical points in the distribution network to monitor pressure fluctuations. These sensors send data to the Grundfos iSolutions cloud, which then communicates with the DDD controller to adjust pump operations accordingly.

IMPACT & INSIGHTS

Digital Demand-Driven (DDD) operations have demonstrated measurable benefits across global implementations, improving system performance while reducing costs and environmental impact.

Key benefits:

- Up to 35% reduction in pipe bursts
- 25-40% energy savings
- 25% reduction in water leakage
- Achieved while maintaining or improving service levels across residential, commercial, and industrial users

LESSONS LEARNED

The implementation of DDD has driven meaningful behavioral and institutional changes:

- Utilities have reported fewer customer complaints, improved regulatory compliance, and increased public trust.
- The system supports proactive maintenance and data-driven decision-making, reducing the need for emergency repairs and service disruptions.

The project fostered collaboration between technology providers and local utilities, highlighting the value of public-private partnerships in promoting sustainable water management.

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