PCP WISE

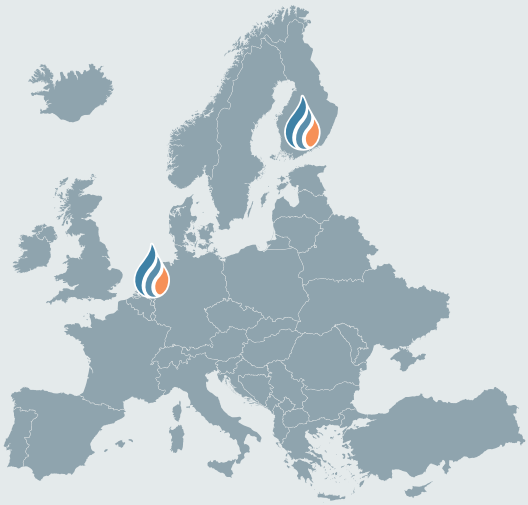
USE CASE 1

URBAN DROUGHT (Northern Europe)

Partners: **Forum Virium Helsinki (FI)**, City of Rotterdam (NL), City of Haarlem (NL), STOWA (NL)

OVERVIEW

Use Case 1 addresses **urban water** issues in Helsinki and Rotterdam by examining the soil-water vegetation system's (SWV) spatial distribution and the effects of human and external factors on water flow. It targets **water shortages** from local storage issues, drought conditions, groundwater over-extraction, and evapotranspiration, which cause low groundwater levels and infrastructure subsidence, impacting streets, homes, and utilities. The urban heat island effect is also worsened by inadequate green-blue infrastructure. The goal is to improve urban water management and climate resilience with smart technologies like **satellites and data science**, monitoring soil moisture, groundwater levels, and surface water to reduce risks from drought, such as heat stress, water stress for vegetation, water quality issues and subsidence. The project aims to gather insights from long-term trends, refine water-related measures, and develop **spatial risk indicators** for water shortages, creating sustainable, resilient cities.



USE CASE 1 IN DETAIL

Pain points & user needs

While Helsinki stakeholders report that much data exists, the problems stakeholders experience relate to the **fragmentation or scattering** of this data, the sensitivity or security-related reluctance to share data openly, and that some datasets are outdated. For Rotterdam, some information is only available to end users as **commercial data**, and end users often need to be experts in the field to work with the available data.

Available tools and data examples

- SCALGO: terrain and surface water model, paid license required
- Fluidit: hydraulic simulation software for water distribution systems, paid license required
- SYKE satellite observations: open satellite data for Finnland from Copernicus and NASA
- FMI sea water level measurements: Finnish sea level measurements provided by the Finnish Meteoroligical Institute (FMI)
- Large-Scale Topography Base Register: detailed large-scale base map of the whole of the Netherlands.
- KNMI daily weather data: temperature, sun, cloud cover and visibility, air pressure, wind, and precipitation for the Netherlands.

HOW PCP WISE CAN HELP

- Regular (and historical) monitoring of soil moisture, evaporation, transpiration and groundwater condition
- Development of risk indicators for water-related issues that cause instability in city infrastructure, based on historical trends and future climate scenarios
- Monitoring of infrastructure subsidence, heat islands, and the condition of green spaces/parks.

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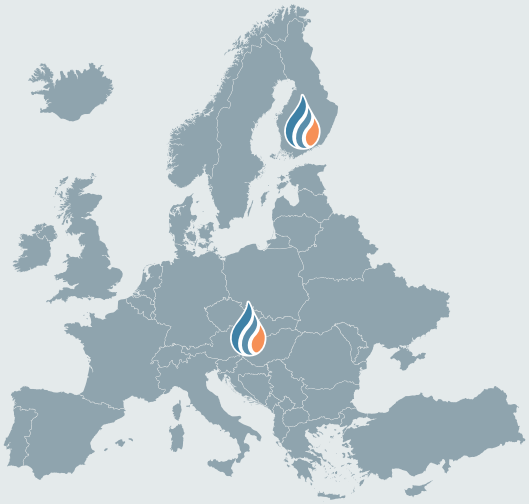
USE CASE 2

URBAN FLOOD (North-Central Europe)

Partners: **SEA (SK)**, Ministry of Interior (SK), Forum Virium Helsinki (FI), Klimatorium (DK), THW (DE)

OVERVIEW

Use Case 2 addresses urban water challenges, focusing on water distribution issues influenced by human and external factors like seepage and rising sea levels. The city of Bratislava, located within the Danube river basin, faces **both water abundance due to storage and infiltration problems and water shortages**, which can damage infrastructure and increase wildfire risks. The goal is to enhance urban water management and climate resilience using smart technologies, including satellite monitoring and data science, to track soil moisture, groundwater, and surface water levels. The project aims to **mitigate risks from flooding, wildfires, and water quality issues** by analyzing historical trends and developing spatial risk assessment indicators. Stakeholders in Bratislava report a lack of data on flash floods, limited public access to drinking and irrigation water data, concerns about open-data security, unclear data roles and responsibilities, and insufficient visualization and interpretation support.



USE CASE 2 IN DETAIL

Pain points & user needs

Stakeholders in Bratislava report a lack of data on flash floods, and that drinking and irrigation water data exists, but is not publicly available. Concerns regarding the **security of open-data sharing** were raised. Furthermore, stakeholders raised issues concerning the **lack of clear roles and responsibilities** and ownership of data, as well as a general issue with a **lack of good visualization and interpretation support**.

Available tools and data examples

- **SHMI hydrological service:** free hydrological data from the Slovak Hydrometeorological Institute (SHMI)
- **National Geoportal:** spatial data (maps and datasets) for Slovakia
- **Climate change adaptation platform:** Platform summarising climate adaptation plans for Slovakia, maintained by the Slovak Environment Agency
- **Spatial data registry:** Slovakian spatial data, and metadata, available for free
- **SHMU Portal:** soil moisture data for Slovakia
- **SYKE satellite observations:** open satellite data for Finnland from Copernicus and NASA
- **FMI sea water level measurements:** Finnish sea level measurements provided by the Finnish Meteoroligical Institute (FMI)

HOW PCP WISE CAN HELP

- Regular (& historical) monitoring of soil moisture, groundwater & surface water
- Development of risk indicators for water-related and flood-related crises that may damage city infrastructure and the surrounding rural area.
- Long-term monitoring of water shortages and excess—based on past (spatio-temporal) trends and future climate scenarios
- Daily spatial risk indicators and local information, presented in a userfriendly viewer

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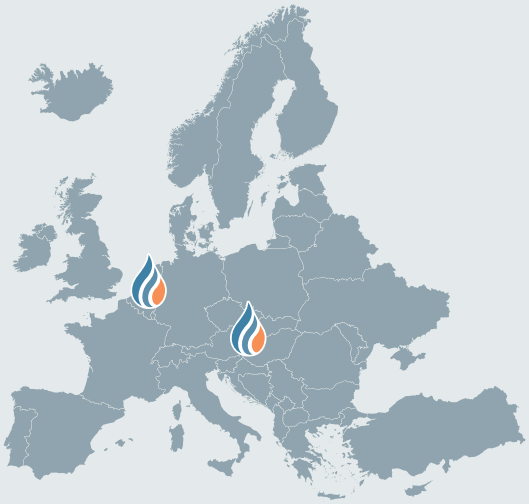
USE CASE 3

RURAL DROUGHT (Northwest-Central Europe)

Partners: **Grenspark Kalmthoutse Heide (BE, NL)**, SEA (SK), Ministry of Interior (SK), STOWA (NL)

OVERVIEW

Use Case 3 focuses on addressing rural challenges in Northwest and Central Europe caused by **extreme climate variability, such as intense rainfall and prolonged droughts**, which impact natural and agricultural processes, leading to wildfires and reduced crop yields in the Grenspark Kalmthoutse Heide (BE/NL). Unlike Southern Europe's structural water scarcity, this region faces **uneven water distribution that fluctuates annually**. The objective is to enhance water management and climate resilience through smart technologies like satellite data and data science, by continuously monitoring soil moisture, groundwater levels, surface water, and evapotranspiration. This approach aims to **anticipate and mitigate risks from rural drought, including wildfires and agricultural losses**, while leveraging long-term historical data to improve interventions and foster resilient ecosystems and stable agricultural outputs.



USE CASE 3 IN DETAIL

Pain points & user needs

Stakeholders from the Gresnpark report a **lack of cross-border datasets** which makes management of cross-border risks like fire and flooding very difficult. Furthermore, stakeholders raised issues concerning the **lack of clear roles and responsibilities** and ownership of data, as well as a general issue with a **lack of good visualization and interpretation support**.

Available tools and data examples

- KNMI Meteo Data: a climate dashboard that includes a large number of graphs showing trends, forecasts, and various future climate scenarios
- EFFIS Portal (Fire risk): European Forest Fire Information System (EFFIS) Portal with an interactive data viewer on fire risk
- Rijkswaterstaat Data: covers topics like water levels, water temperatures, wave heights, and wind speed.
- Flanders Data Repository: Digital Elevation Model Flanders, among others.

HOW PCP WISE CAN HELP

- Continuous (& historical) monitoring of soil moisture and groundwater conditions
- Development of risk indicators for drought-related issues that may trigger rapid-onset crises affecting ecosystems and agriculture
- Crisis intelligence on wildfires through daily and spatially explicit risk indicators
- Intuitive viewer for end-users and aligned with existing crisis response protocols
- Assessments of water availability and biomass (as fire fuel) for both natural and agricultural vegetation

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USE CASE 4

RURAL DROUGHT & FLOOD (Southern Europe)

Partners: **IEEC/ICGC (ES)**, Region of Central Macedonia (EL)

OVERVIEW

Use Case 4 addresses rural challenges in Southern Europe, namely Catalonia, due to extreme climate variations, such as intense rainfall and prolonged droughts, which impact agriculture, forestry, biodiversity, and wildfire risks by altering biomass, fuel loads, and soil moisture. The **decline in water availability leads to conflicts over groundwater and surface water** use among agriculture, ecosystems, industries, and public consumption, while reduced soil moisture and forest degradation exacerbate wildfire spread and complicate ecosystem recovery. Unpredictable **extreme rainfall increases flood risks** in densely populated coastal areas and river basins with limited water management. To tackle these challenges, it is crucial to identify, monitor, and map soil moisture, root zone conditions, and groundwater levels to detect environmental changes, assess impacts, and evaluate soil capacity and forest stress. This real-time monitoring supports the **development of effective adaptation policies** based on weather patterns and climate variability, with regular monitoring of soil conditions and vegetation biomass being essential due to the rural water balance being driven by evapotranspiration.

USE CASE 4 IN DETAIL

Pain points & user needs

Stakeholders in Catalonia report a **lack of data on the actual consumption of groundwater** from urban areas and agriculture, evapotranspiration and precise knowledge about the impact of groundwater status on coastal environments.

Available tools and data examples

- AEMET and SMC Meteo Data: includes free meteorological and atmospheric data, can be downloaded through an OpenData portal
- European Groundwater Measurements: European Freshwater Information System for Spain, containing data on water abstraction and freshwater resources
- ICGC soil measurement station network (XMS-CAT): publicly accessible soil moisture measurement data from the XMS-CAT that belongs to the International Soil Moisture Network and includes soil moisture and temperature
- ICGC Maps: key geospatial information can be provided as inputs to architectures to modelling water cycle interactions such as soil maps and land cover maps
- Menut Mission Satellite images for Catalonia: interactive map viewer of satellite imagery
- Meteorological forecast of Catalonia: two daily weather maps (morning & afternoon), updated daily

HOW PCP WISE CAN HELP

- Continuous monitoring of soil moisture (surface, subsurface, and root zone), groundwater, and evapotranspiration levels
- Integration of smart meteorological data and Earth observation datasets (spectral analysis) to develop risk indicators for drought-related crises affecting agriculture and ecosystems
- Long-term climate monitoring based on past spatio-temporal trends to forecast future climate scenarios and assess risks in different sectors (agriculture, forestry, and natural ecosystems)

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USE CASE 5

RURAL DROUGHT & FLOOD (Northern Europe)

Partners: **Klimatorium (DK)**, Technisches Hilfswerk (DE), STOWA (NL)

OVERVIEW

Use Case 5 addresses rural challenges stemming from **extreme fluctuations in groundwater levels**, which lead to land-use issues and impact infrastructure, utilities, and crisis response in rural Denmark, the Neatherlands and Germany. These fluctuations cause soil moisture variations, resulting in **subsidence and uplift**, with some areas in Denmark experiencing subsidence rates of up to 6-7mm annually. Peatrich soils are particularly vulnerable, risking organic oxidation and underground fires in rural Germany, while **high groundwater levels can overload wastewater systems** as seen in Denmark. Since the 1980s, rising shallow groundwater has caused significant infrastructural damage in Denmark, necessitating smart monitoring and investment security. Key objectives i**nclude identifying and mapping soil moisture and groundwater levels**, supporting real-time monitoring, and assessing land use changes. Effective risk management involves proactive measures for extreme scenarios like peat fires and flooding, analyzing historical trends, and developing spatial risk indicators to ensure resilient rural ecosystems and stable agriculture amid climate change.

USE CASE 5 IN DETAIL

Pain points & user needs

Stakeholders in Denmark report a **lack of robust forecasting models to enable scenario analysis** and support decisionmaking, especially when it comes to risk assessments. **Data sharing practices are also lacking**, and risk perception among the population can lead to detrimental risk behaviour. They also report a **lack of local-scale data** and that national-scale datasets cannot always be scaled down.

Available tools and data examples

- **Vejrudsigt Portal:** Danish Meteorological Data Portal, including free weather and ocean datasets
- **Danmarks Miljøportal:** Danish Environmental Portal, containing free GIS, land use, and other public data
- **Danmarks Areal Information:** Connected to the Miljøportal, an interactive spatial data viewer
- **Klimaatlas:** Free Danish climate data, showing climate from the past, the present and for future scenarios.

HOW PCP WISE CAN HELP

- Continuous monitoring of root zone soil moisture, vegetation health, groundwater levels (including evapotranspiration), precipitation, and surface water conditions using smart meteorological (spatio-temporal) inputs.
- Development of risk indicators for drought and flood-related crises affecting agriculture, ecosystems, and rural infrastructure.
- Long-term climate monitoring to analyze historical trends and forecast future water availability in local and regional river basin areas, helping to create sector-specific risk indicators (agriculture, nature conservation, and rural infrastructure).

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FACTSHEET

PRE-COMMERCIAL PROCUREMENT

Pre-commercial Procurement (PCP) is a targeted strategy for acquiring R&D services that encompasses competitive development across three distinct phases, sharing risks and benefits under market conditions. It distinctly separates the PCP process from the subsequent deployment of commercial end-products, which may lead to a follow-up **Public Procurement of Innovative Solutions (PPI)**.

Key Features of Pre-Commercial Procurement

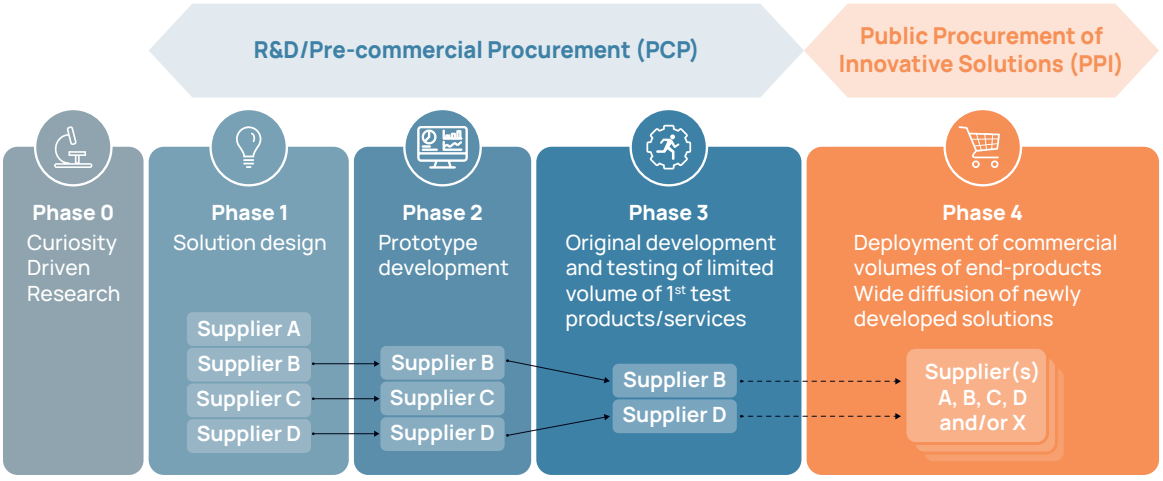
- **Identifying Optimal Solutions:** PCP seeks to determine the best possible solutions available in the market by simultaneously comparing various approaches from different technology vendors. The solutions are developed up to TRL level 7-8.
- **Driving Innovation:** By directing the development of innovative solutions toward specific public sector needs, PCP can inspire the industry to undertake R&D efforts that were previously unconsidered.
- **Active Role of Procurers:** In a PCP, the buyers (or procurers) clearly articulate their requirements for the solution. They position themselves as potential early adopters of the developed solutions.
- **Three Phases:** PCP takes place across three distinct phases - solution design, prototype development, and testing and validation - where the best solution is selected through competition between suppliers.

KEY BENEFITS OF PRE-COMMERCIAL PROCUREMENT

- When no market solutions exist to meet a current or future genuine need, procurers like public authorities can adopt the PCP approach. This allows them to acquire R&D services from **various technology providers who compete** across the three PCP phases.
- PCP is not governed by the EU Public Procurement Directives. This **flexibility enhances competition and reduces risks** for the public buyers.
- The PCP approach **accelerates the time to market** for innovative solutions while creating opportunities for European companies, especially SMEs, to expand into new market segments driven by public demand.
- A PCP can encourage the involvement of international companies by **facilitating collaboration among multiple public organizations** for joint cross-border procurement, leveraging the Horizon Europe Programme.

HOW PCP WISE IS LEVERAGING PCP FOR EUROPEAN WATER INNOVATION

PCP WISE uses the PCP approach to address one overarching challenge, water - both where it is too scarce and where it is too abundant in Europe - through the **exploration of 22 use cases across diverse settings**, including rural and urban areas, as well as fast and slow-onset crises. The goal of PCP WISE is to **tackle largescale issues** with broad European applicability while ensuring scalable, practical solutions that **benefit public buyers** and multiple regions.



Infographic showing the 3 phases of PCP and a potential 4th phase of PPI.

Source: European Commission

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