Water Demand and Supply of Metallurgy Sector

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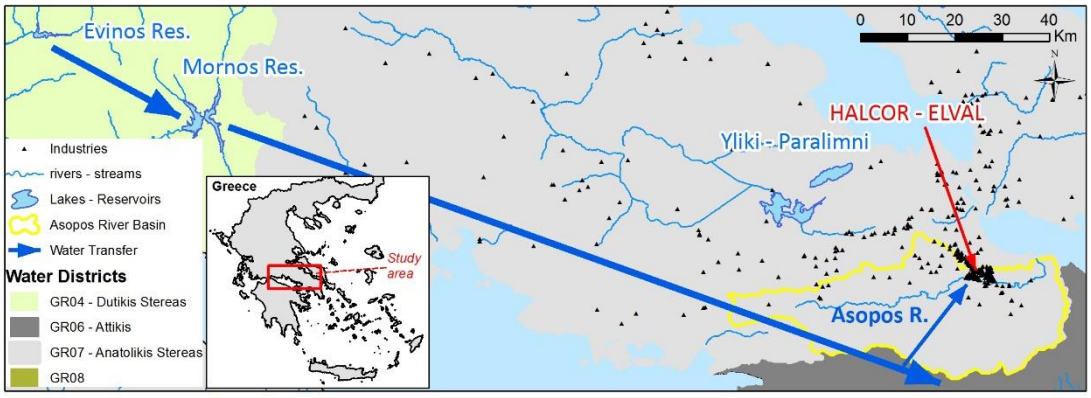
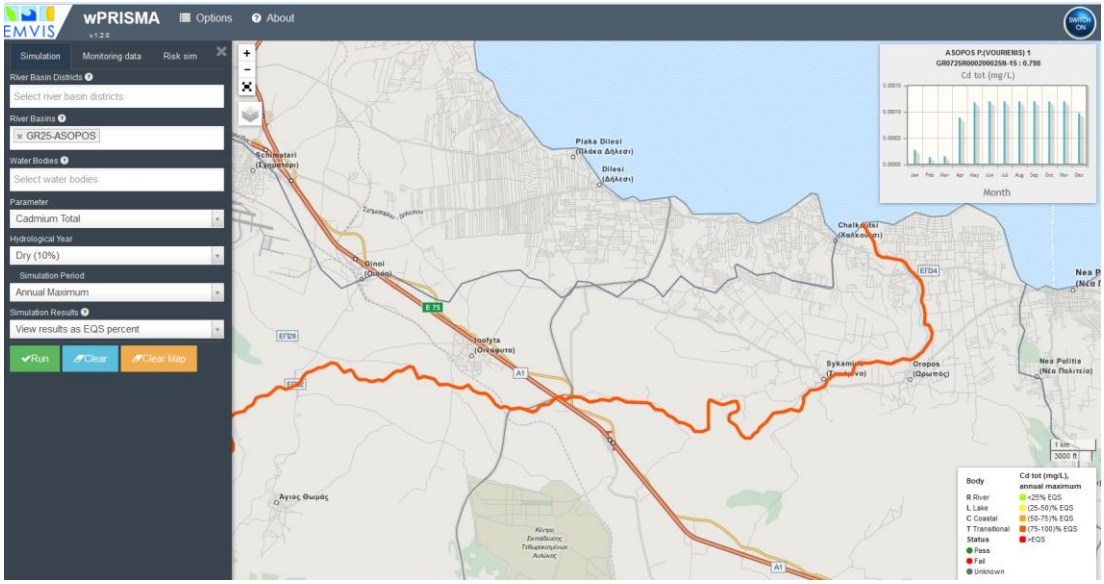
Summary

The Groups of HALCOR and ELVAL operate in the greater area of Asopos River Basin since 1973, now with six productive subsidiaries in the copper and aluminum sectors, with leading position in the Greek market and competitive presence outside Greece. They need to know the exposure of their business to water related risks in order to ensure future sustainability. Indicators of flow characteristics for different water bodies serving as inflow sources and effluent receiver are key feature of the risk assessment.



Study Area – Waterbodies related to industry assessment



Modeling river pollution due to industry emissions using wPrisma developed under SWITCH-ON project

1 Case Study Description

1.1 Water-management issue to be solved

The Groups of HALCOR and ELVAL operate in the greater area of Asopos River Basin since 1973. The metallurgy industry uses water in many stages of their production. This water is provided, recently, from the two reservoir system of Evinos and Mornos which are the main reservoirs that supply Athens waterworks. A large population number depends on this natural resource and the industry needs to know if this resource will continue to cover different water uses in the future. Further, industry's effluents are disposed of in Asopos River, which receives significant pressures both in terms of quantity and quality, mainly attributed to water abstraction for irrigation and to the significant industrial activity in the area, respectively. The industry needs to know if effluent disposal into the river will continue to be permitted or if disposal regulations are going to be more demanding.

1.2 Decision support to client

Based on the current assessment, the client is going to decide: (a) if reassessment of water supply strategy and investigation for other possible sources of water will be required and (b) if it will be necessary to invest on more expensive and effective effluent treatment facilities.

1.3 Temporal and spatial Scale

The client is interested in evaluating (1) water availability and (2) assimilative capacity of effluent receiver for a period of maximum 10 years ahead. The abovementioned goals concern the Asopos River basin (regional scale), extending in an area of about 720 km^2 as well as Evinos and Mornos reservoirs subbasins (regional scale), which cover an area of about 920 km^2 in total.

1.4 Knowledge Brokering

The communication with the client takes place via meetings in person, phone calls and e-mails.

Meetings with the client are arranged whenever something must be presented in order to be explained and discussed. Presentations of the concept of the project and our planed workflow, combined with discussions over the presented material have led to a first level of understanding: The client begins to realize the information that can be made available and the level of service that can be offered and we (the knowledge purveyors) better understand the client's needs and are aware of clients problems that can arise and need to be solved. Meetings are followed by phonecalls or e-mails in order to (1) clarify matters that came up during the evaluation of meeting results, (2) request data required for the assessment, (3) inform over the progress of the project and (4) arrange a new meeting. Intermediate results of the assessment will be presented to the client via meetings in person in order ensure that: (i) results are useful for the client, (ii) it is clear to the client what can and what cannot be expected from the certain assessment and (iii) to re-asses the client's needs based on discussions over (i) and (ii) presented above.

1.5 Climate Indicators

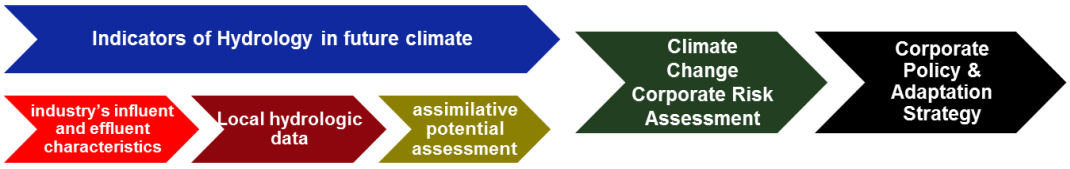
1.5.1 Pan-European Indicators

Hydrological data (Pan-European indicators), under climate change scenarios, including low flow characteristics (discharge, mean annual duration etc), indicators on most prevailing flow conditions and discharge time series will be necessary for the evaluation of future quality status of Asopos River and water availability of Evinos and Mornos subbasins.

1.5.2 Local indicators

The investigation of possible connections between hydrological forcing data (from pan-European models) and historical water quality and availability problems may reveal useful, local indicators.

1.6 Pan-European data to local scale



Indicators of Hydrology and future climate *– Identification of future discharge characteristics for three basins: (a) Evinos & Mornos reservoir subbasins which provide the necessary water and (b) Asopos River which is the effluent water receiver. Relative indicators: (1) future change of low-flow discharges, low flow characteristics (discharge, mean annual duration etc) but also indicators on most prevailing flow conditions and (2) future predictions of discharge time series to be directly evaluated. Indicators result from Pan-European hydrological models, which were based on Pan-European climate change predictions from an ensemble of climate models.*

Industry's influent and effluent characteristics *– Collect and assess data concerning industry's water consumption, water use and effluent characteristics. Identify major pollutants.*

Local hydrologic data *– Local data enquiry relative to fresh water sources of Mornos and Evinos reservoirs subbasins and their water uses. Evaluation of current water availability and quality.*

Assimilative potential assessment *– Analysis of pressures on Asopos River, which is the industry's effluent receiver, and its current assimilative potential through the application of water quality modelling tool developed under the Switch-on project.*

Climate Change Corporate Risk Assessment *– Local data, such as the interconnection of Evinos and Mornos subbasins with Asopos river subbasin through the waterworks of Athens,*

the number and effluent characteristics of industries related to the Asopos system as well as economic and population growth potential for the area of interest, are combined and co-evaluated with pan-European discharge indicators (see on the above) and climate change impact on the industry's operation is evaluated. Estimation of water related risks (physical risks) and possible long-term changes in environmental permits (regulatory risks).

***Corporate policy & Adaptation Strategy** – If business sustainability and/or growth are facing a possible threat due to climate change, strategic adaptation measures will be discussed. Uncertainties of the assessment, related to the uncertainties of the climate change indicators, can be crucial and will be estimated if timely or costly investments from the company's side should be required. Adaptation or re-evaluation of industry's water management plans.*

1.7 Lessons learnt

The present assessment aims to reveal exposure of the client to water related risks and sustainability issues which may arise due to future change in climate conditions. It is expected that the climate service will provide, through an organised, easy-to-access and clear way, a number of different scenarios of future hydrologic conditions. This alone will contribute in making a more thorough assessment based on current scientific data from various sources and will raise the quality of the analysis and the usefulness of the outcome.

1.8 Importance and Relevance of Adaptation

The client (Groups of HALCOR and ELVAL) operates in the greater area of Asopos River Basin since 1973, now with six productive subsidiaries in the copper and aluminum sectors, with leading position in the Greek market and competitive presence outside Greece. Water use, as a constituent for production and as an effluent receiver, is of major operational importance. Identification of exposure to water related risks, under changing climatic conditions, is a key factor towards business sustainability. Estimations based on current conditions and previous experience or on application of web based tools developed recently for the estimation of water related risks, is a current tactic applied by the client concerning this kind of decision making. The Climate Service is expected to provide a series of different climate impact indicators and variables, which are based on current scientific knowledge, which can be easily accessible and will be available for different scenarios. As a result, the effect of climate impact on hydrology and river water quality can be assessed thoroughly, increasing the client's climate adaptation abilities.

1.9 Pros and Cons or Cost-Benefit analysis of climate adaptation

Changes in water availability could led to changes in water resources allocation, with the water supply of the city of Athens being prioritized and the client (industry) led in search for other water sources, raising the cost of water and even leading to a reallocation of the industry. Changes of the hydrologic regime could lead to decrease of Asopos River assimilation capacity, trigger a regulatory change towards stricter effluent regulations and significantly raise the cost of effluent treatment with adverse economic impact on the client. Climate adaptation would make the client more resilient against possible changes, therefore could indirectly reinforce the local economy, and will conserve the water quality of the effluent receiver (Asopos River).

1.10 Policy aspects

The present case study is directly related to present policies and implementation. Restrictions imposed on effluent characteristics of industry (client) have an economic effect on the client and a possible change towards stricter criteria, due to future river discharge conditions, must be taken into account by the client. Furthermore, the present case study investigates the potential of establishing certain policy for water resources apportioning between users, which also may have an adverse effect on the client.

1.11 Contact

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