

Application of GIS in Design of Process Facilities and Environmental Impact Analysis

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1

Assisting during the design and construction on phases

- Adding real-world geography improves decision making, planning, and permitting phases, which involves assessing social, economic, and environmental impacts – all areas that could slow down or halt projects
- By placing the model in its actual location, clients and designers can understand the design in ways not previously achieved
- All of this leads to better value for our clients. Improved understanding of the designs and modifications and their impact on the surrounding environment increases client satisfaction and decreases costs for changes because something was misunderstood
- The data life cycle's importance - with GIS, the information flow does not just end when a construction is completed.



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2

Psyttalia Wastewater Treatment Plant



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3

Psyttalia Wastewater Treatment Plant

- The Psyttalia WWTP is the main wastewater treatment plant in the greater Athens area, receiving an average wastewater flow of approximately 730,000 m³/d.
- The Psyttalia WWTP capacity is 5.600.000 p.e., being one of the biggest WWTPs in Europe and worldwide.
- The sludge drying unit final product (120 – 150 t/day with approximately 92% dry matter) is a renewable source of energy and it is being utilized as secondary fuel in cement factories and power stations.



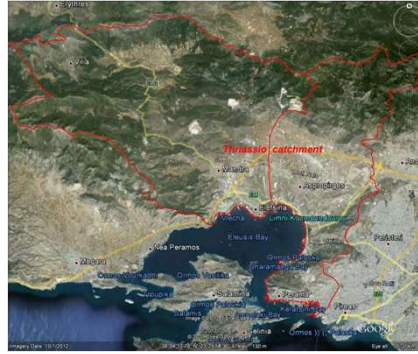
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4

Design and Tender Documents of WWTP

- Masterplan, Feasibility Study, Detailed Design and Tender Documents for the stormwater drainage, sewerage and wastewater treatment works for the western suburbs of Greater Athens in Thriassio

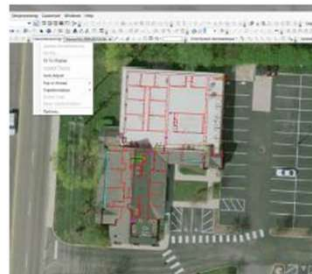


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5

CAD to GIS



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Pipelines

- In field, Oil and Gas company may have thousand pipeline segments and thousands pipeline kilometer length.
- Most Mechanical Engineer understand how to use Auto CAD to create pipeline layout and isometric drawing. In this drawing we can find pipeline length, pipeline material, pipeline thickness etc.
- GIS can give a solution to Mechanical Engineer to get advantages of Microsoft Excel and AutoCad drawing. In GIS we can see pipeline attribute, find the location, visualize it and do a lot of database activities.
- Pipeline location is monitoring by GIS database and people use GPS to find the pipeline location at field - the idea of using GIS software is to visualize pipeline data or pipeline condition related to its location
- We can make an oil spill simulation by using a software that run on GIS.



District heating

- The design, dimensioning and cost estimation of a district heating network poses many challenges.
- Especially for large networks, producing a network layout manually is complex and time-consuming.
- Specialized software and custom-made spreadsheets allow automated hydraulic calculations and pipe selection, but can be error-prone if not properly used and are might not be suitable for large networks.
- In short, the different design aspects typically require different software tools and the process is usually not well-integrated.
- One methodology for assessing the energy and economic feasibility of new district-heating networks in urban areas for the integration of industrial waste heat sources could use GIS with build-in data analysis tools, combining various georeferenced data



Application of GIS in selection of location for design and construction of power plants

- An analysis of natural (seismicity, geological background, hypsometry, slope of the terrain, distance from faults, ground cover, land use method) and anthropogenic conditions (distance from the state and other borders, settlements, industrial facilities, roads and railways) can be performed, taking into consideration protected areas due to its ecological significance.
- With multi-criteria analysis, weighting coefficients can be assigned for each criterion

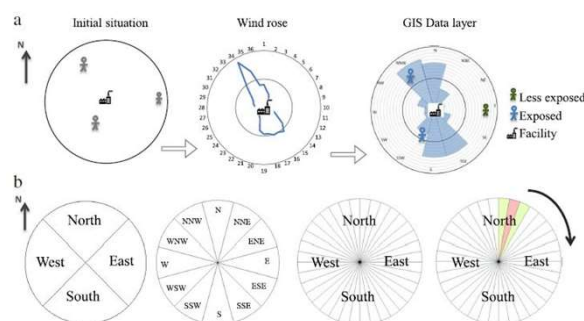


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9

Air quality monitoring - a GIS-based atmospheric dispersion model for emitted pollutants

- Development and performance evaluation of a GIS-based metric to assess exposure to airborne pollutant emissions from industrial sources using historical data



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10

Maintenance and inspection data

- GIS can be used to model anything that has both a physical or spatial component and data about that component
- Smaller-scale detailed models can be created for facilities like combustion turbines or power plant boilers.
- These models can be two- or three-dimensional models depending on the users need for detailed visual information.
- Maintenance and inspection data can be tied to the model.
- With the spatial component GIS provides you may perform analysis on several years of historical maintenance information



Maintenance and inspection data - example



