**Interim Report**

**EE5500**

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# Introduction

The purpose of this report is to give an initial overview about the master dissertation project, which topic is water resource planing in the UK with the help of modern web technologies.

This project will be done in cooperation with another student (WOJI), so this report will briefly describe the background of the project and will then focus on the part which is relevant for this dissertation. After the information about the backgound of the project, there will be a part which describes the initial survey done. Furthermore, this report gives information about the aims and objectives of the dissertation and the expected outcomes as well as the time plan for the project.

In the UK millions of pounds are invested in securing water resources

- Water Plants

- Sensordaten

- Datenanalyse

- Repräsentation der Daten

- Hier wird der repräsentative Teil besprochen (wojtek macht den anderen)

# Background to the project

“Customers’ top priority for water services is a safe, reliable supply of water at a price they can afford” (Zitat Water UK). Because of different factors the risk of droughts in the UK increases steadily and there have also been some droughts during the last 40 years which were worse than those that had been used as the basis of planning. (Referenz Water UK). One factor which is responsible for the increased risk of a drought is the climate change as well as the resulting increased evaporation during the warm months of the year. Another factor is the population growth, which is estimated to be between 6,6 million and 16 million by 2040 for England and Wales. Especially regions with the least resilience regarding water resources are subject to most population growth and climate change. (Referenz Water UK)

BILD (irgendeins)

To protect customers as well as the industry from the consequences of serious droughts and to enable an economical and environmental efficient use of water resources, politic and the water industry have to make strategical long-term and short-term decisions regarding water infrastructure to be able to gain resilience.

The problem is that in water industry there is no technology which provides information about the overall state of the current water resources, neither for consumers nor for providers or political decision-makers. Because of this missing knowledge, there is much lack of efficiency regarding different aspects, e.g. energy consumption or cost. It is not possible to achieve an efficient water resource planning without information about important key indicators and predicitons.

Wastewater treatment plants of different water providers are equiped with different kinds of modern sensors, measuring data regarding several key indicators like Carbon Footprint, Energy Consumption & Generation, the yield of the By-Products of the processes, and the Overall Performance of the Equipment and Reliability (Productivity). This sensor data from different plants is collected and migrated to a common data model.

# Initial survey

This survey is a quick preliminary survey, to discover something of the 'shape' of the relevant field of information; in doing this you will identify key abstracts, journals, books, series of reports, and so on. Key technical issues will be summarised.

The basis of this project is the data collected by wastewater treatment plants. This data is categorized in the industry’s key performance indicators. Those indicators are Carbon Footprint, Energy Consumption & Generation, the yield of the By-Products and the Productivity, which means the performance of the Equipment and Reliability.

A wide range of organisations work with water companies to ensure customers get the best services for the best possible price, and that the environment is protected. (Referenz <http://www.water.org.uk/about-water-uk/regulation>) These organisations can be categorized in:

Governmental organisations:

[Defra](https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs) - the UK government department responsible for looking after our natural environment, supporting our world-leading food and farming industry, and sustaining a thriving rural economy. Defra sets the overall rules for water services in England.

[Welsh Government](http://gov.wales/?lang=en) - the devolved Government for Wales which works to help improve the lives of people in Wales and make the nation a better place in which to live and work. The Welsh Government sets the overall rules for water services in Wales.

Regulators:

[Drinking Water Inspectorate](http://www.dwi.gov.uk/) - provides independent reassurance that water supplies in England and Wales are safe and drinking water quality is acceptable to consumers.

[Environment Agency](https://www.gov.uk/government/organisations/environment-agency) - responsible for regulating industry waste, as well as water quality and resources in England. They are also responsible for managing the risk of flooding from rivers, reservoirs, estuaries and the sea.

[Natural England](https://www.gov.uk/government/organisations/natural-england) - the government's adviser for the natural environment in England, helping to protect England's nature and landscapes for people to enjoy and for the services they provide.

[Natural Resources Wales](https://naturalresources.wales/?lang=en) - works to ensure that the environment and natural resources of Wales are sustainably maintained, enhanced and used, both now and into the future.

[Ofwat](https://www.ofwat.gov.uk/) - the economic regulator for the water and sewerage sectors in England and Wales. It works in the interest of customers by setting price limits, ensuring companies run efficiently and encouraging resilience.

Consumer Watchdog:

[CCWater](http://www.ccwater.org.uk/) - The Consumer Council for Water promotes consumers' interests to governments, regulators and water companies. They also provide a free advice and complaint handling service for consumers, research their views on key topics, and keep them informed on the issues that affect their services.

All these organisations have different kind of interests in the data, which has to be considered when doing a data analysis with a visualized result.

- Andere Industriebreiche machen das schon so

- Welche Technologien benutzt man

- Wie muss so etwas aufgebaut werden?

- Wer ist das Zielpublikum?

- Herausforderung: Wie kann man Zusammenhänge zwischen realen Daten und äußeren Einflüssen feststellen und evtl. Vorhersagen treffen

# Aims and Objectives

A clear statement of the Aims and Objectives. Remember, aims and objectives are generally a statement of what is to be achieved, not how it is to be achieved.

The main objective of this project is to develop a central platform which analyzes and visualizes data for water resource planning for different stakeholders. This data should picture different abstraction levels:

- stratetic level: level which enables users to create strategies (e.g. price shouldn’t go over x)

- operational level: engineering level combined with external factors (e.g. weather)

- engineering level: lowest level/plant level

For example an end consumer wants to see different kind of data than a representative of a water provider company or a politican which aims towards developing a strategy for water resource management. The visualized data This should be achieved by analyzing real-time data and/or historical data combined with different external factors like weather conditions. It is necessary to have a fitting security concept to guarantee that every user role can only see information which it should be allowed to see. For example a member of a water provider company shouldn’t be able to see sensitive data from another provider company (of course a consumer shouldn’t also be able to see sensitive copmpany data).



The illustration (reference) shows that the plants collect the sensor data **TODO**

Each service provider categorizes the data from its plants in different indicators. The Large Network Performance Collider collects this data and converts it into a common model. This collected data is the basic information for the data analysis which has to be done to create the representation for stakeholders to enable strategic decision making.

- Repräsentation von Daten

- Zugeschnitten auf bestimmte Interessengruppen

- Zuhilfenahme von historischen Daten

- Rollenkonzept

- Ermöglichen von strategischen Entscheidungen

- Ermöglichen von Informationsvermittlung aktueller Situation bezüglich Wasserklärung unter Berücksichtung äußerer Einflüsse

# Experimental/investigative methods to be adopted

An outline of the key activities necessary to complete the project, itemising the experimental methods to be used (in, for example, a design-based project), or the investigative techniques to be adopted (in the case of, say, a critical survey).

It has to be analyzed which cloud technologies will be used

- Webanwendung

- Cloud-basiert

- Datenanalyse

- Sicherheitskonzept

- Analyse des Zusammenspiels von Daten

- Strategie zur Visualisiereung

# Time-plan

Strongly related to the key activities identified above.

- tbd

# Deliverables or specific outcomes

A clear statement of the expected outcome(s).

The expected outcome of this dissertation is a working prototype of a cloud application which visualizes data regarding water resource planing considering real-time data, external factors and historical data. This prototype should use a fitting security and role concept. The overview should help stakeholders to get an idea of the current state in their area of interest and make them able to make strategic decisions to achieve a certain change. Besides the representation a data analysis has to be done to prepare the visualized data.

- Prototyp der Webanwendung

- Umgesetztes Rollenkonzept

- Visualisierte Daten

# Bibliography

-Water UK Quelle