Water-Reuse in Industrieparks

GEFÖRDERT VOM Bundesministerium für Bildung und Forschung

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NaWaM WavE

Multi-criteria Assessment of Water Reuse in Industrial Parks

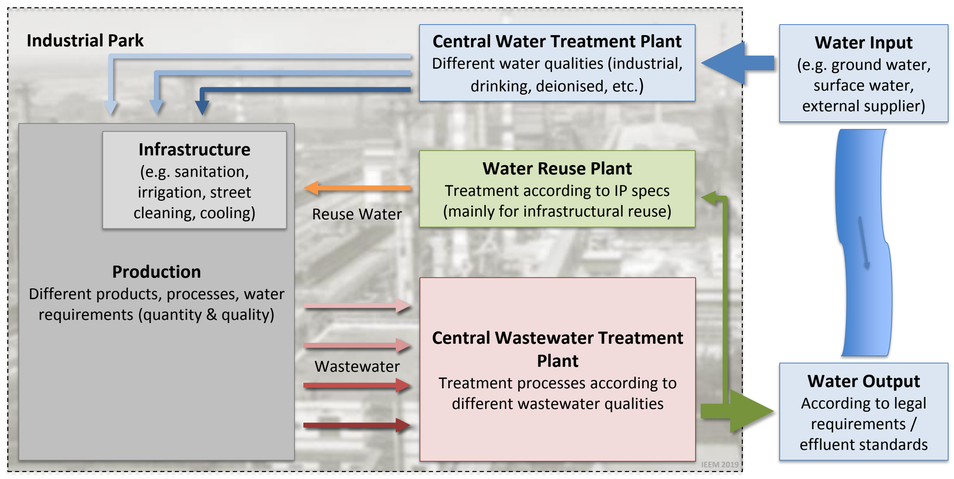
Model-based Planning and Assessment

Introduction

Based on studies of several **Industrial Parks (IPs) in China, Vietnam and Germany** a sustainable water reuse concept for IPs is being developed under the framework of the BMBF funded project WaReIp (grant no. 02WAV1409).

IPs play a significant role in urban development. The concentration of industrial production is on the one hand a major challenge with regard to increasing water demand, (regional) water shortages and other environmental impacts. On the other hand these parks open up a wide range of possibilities for saving resources, energy and costs.

An **Industrial Wastewater Management Concept with a focus on Reuse** (IW²MC→R) has been developed under the WaReIp project. Its resource efficiency and economic viability will be evaluated based on a Model Industrial Park using multi-criteria assessment tools.

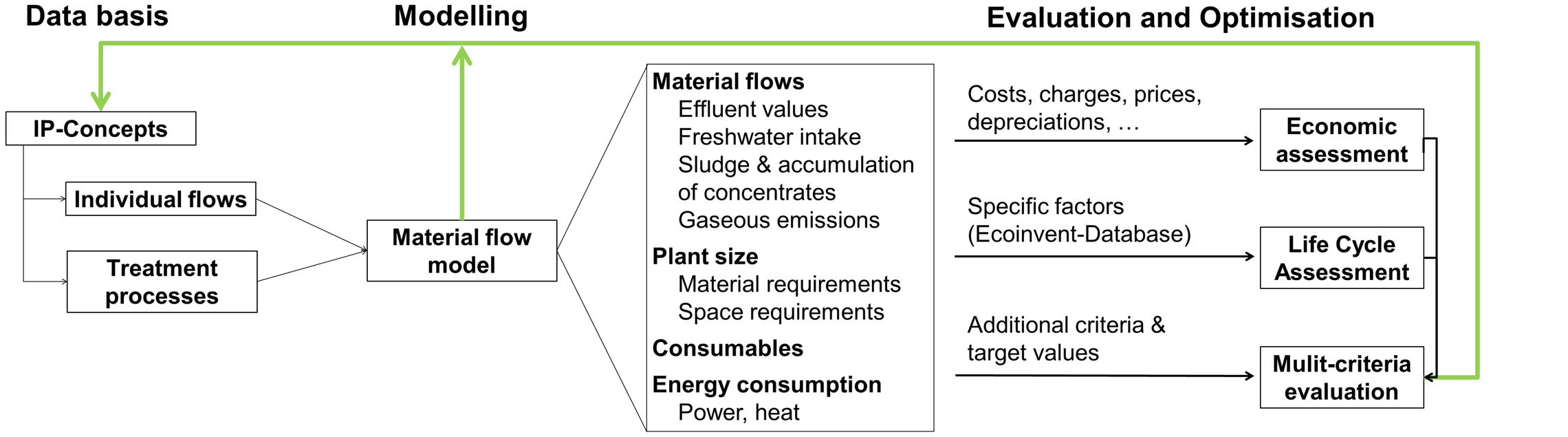


Aim

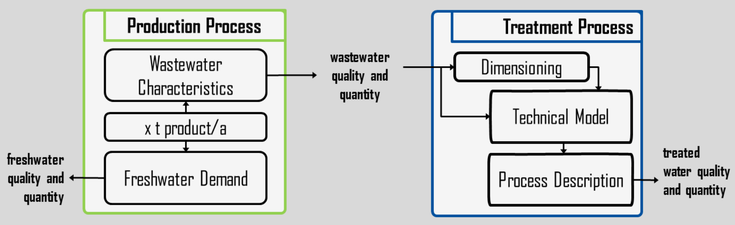
Development of a modular and easily adaptable **planning and assessment tool for water management concepts in Industrial Parks (IPs)** focused on water reuse & resource protection.

Methodology

- Generation of different IP concepts and representation in the **Material Flow Model**
- Model-supported calculation of material flows and plant data as input for **Economic Evaluation** and **Life Cycle Assessment**
- Improvement and **optimization of the IP concepts** based on the results of the material flow model and evaluation

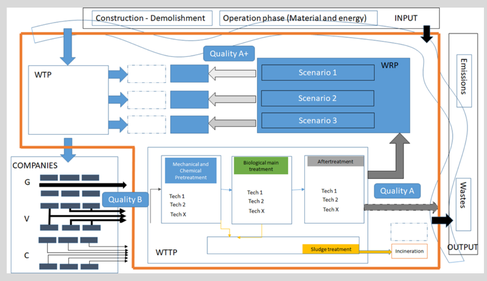


Module library & material flows



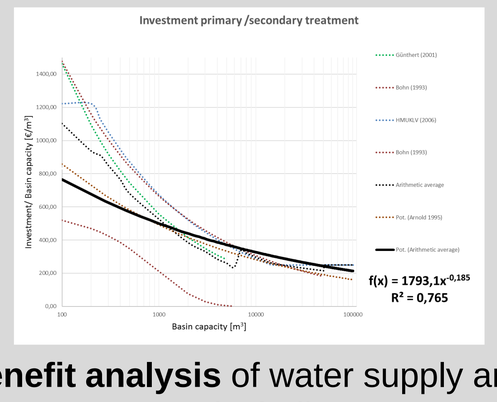
- Connecting **IP modules** (production & treatment processes) with **material flow model** to calculate material flows and (static) plant data
- Direct calculation of performance indicators for reuse concepts

Life Cycle Assessment



- Based on 1 m³ wastewater as functional unit and IP water circle (system boundary)
- Assessing the **environmental performance** of treatment processes using the Product Environmental Footprint

Economic Evaluation



Cost-benefit analysis of water supply and wastewater treatment including

- CAPEX & OPEX of treatment processes
- External effects & drivers for reuse

Multi-criteria assessment and sensitivity analysis to evaluate different reuse concepts and to optimize IPs with regard to efficient use of scarce resources.

Conclusion

Multi-criteria assessment provides a useful and efficient tool to **evaluate and optimize water reuse concepts** basing on technical, economical and ecological aspects. It can be used both for the evaluation of reuse concepts for existing IPs and for planning of new IPs (“green field sites”).

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