Holistic management approach and KPIs

The scope was to develop a model and a framework for a holistic water management and to define relevant performance metrics (key performance indicators, KPI) that support the activities within water saving and process optimisation. The focus was on the sectors chemistry and steel, but it may also be applied to other industrial sectors. The idea is to provide a system approach for implementation where no dedicated water management exists, but also that components of this system can be used and integrated into existing management systems and improvement programs at companies in the process industry by a step by step model a so called PDCA-cycle (Figure 1).

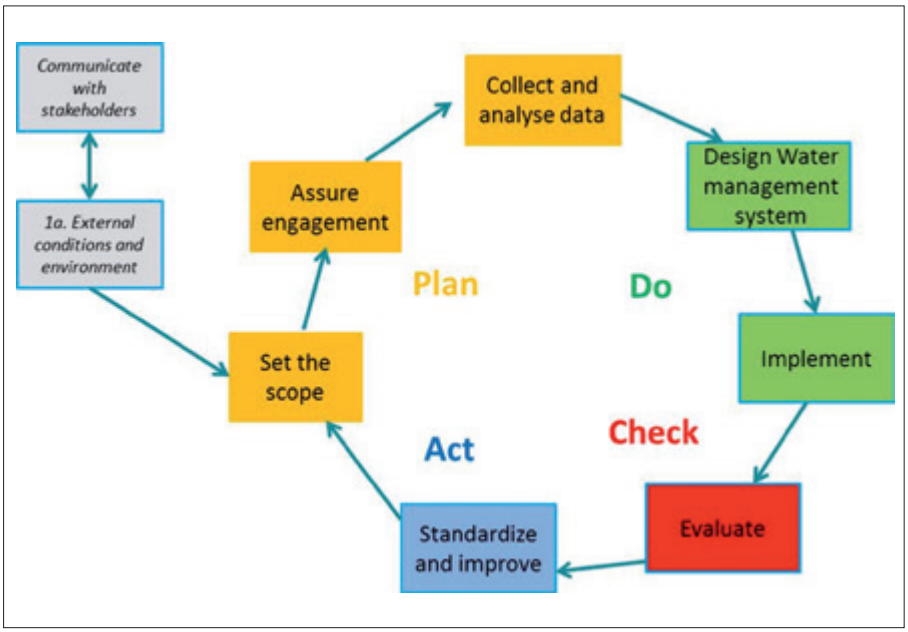

Figure 1: The overall procedure of Water management, PDCA-cycle

The suggested system considers experiences from existing frameworks and is based on the different needs for different stakeholders like external conditions, corporate management, site management, plant operators, the supply chain etc. A step by step model has been developed and tested at the industrial partners in the project. The basic elements are described in Figure 1.

At site level, a model is proposed for a water balance considering the external conditions. An analysis of the specific water demand for each operation within the site and, if possible, finding synergies between

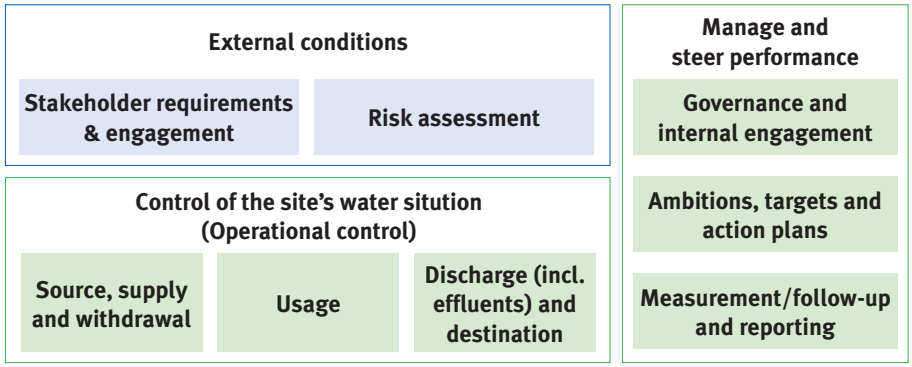

Figure 2: Basic structure for Water Management

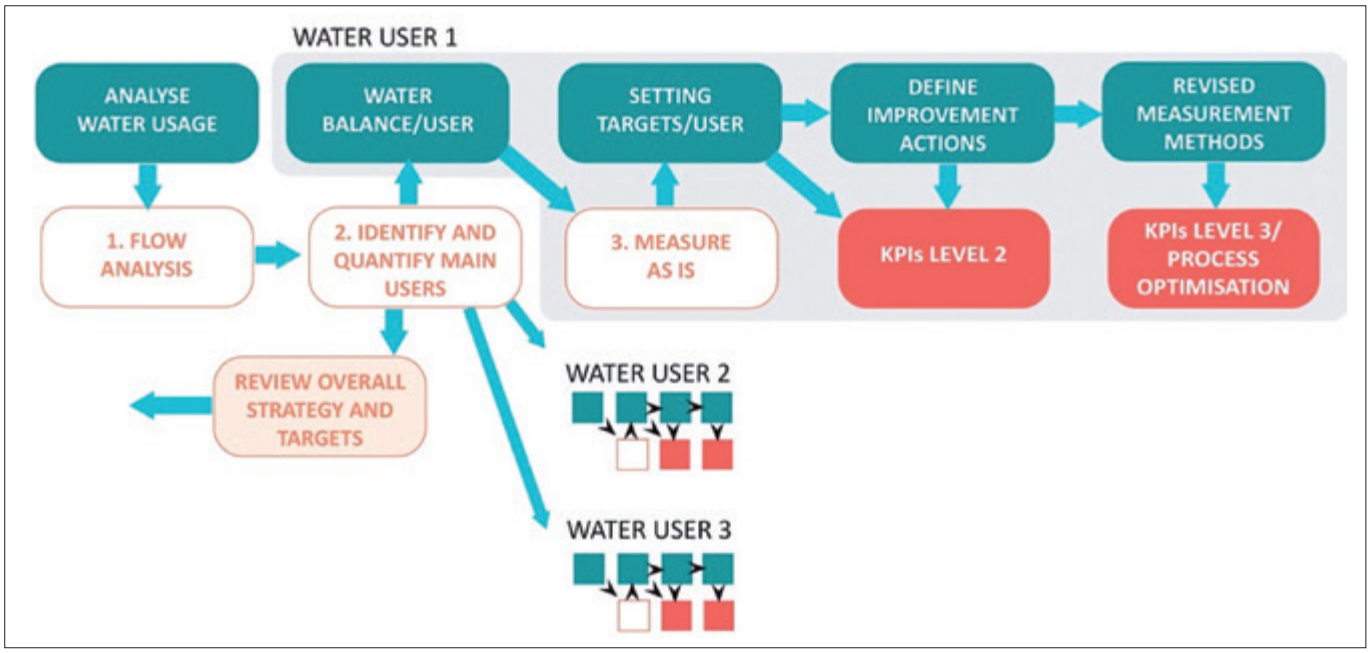

Figure 3: : Water balance and KPIs are developed for each specific water using process and activity at the site.

them (e.g. water recycling). A step-by-step procedure is proposed where the next step is to identify and find improvement opportunities tailored to each individual user, as shown in figure 2, and an LCA can be used to prioritise identified opportunities. The project has demonstrated that a holistic approach is important when working with improvements. The main benefit of optimizing water-based processes can also be to save or recover other critical resources for a site or process, e.g. process chemicals.

Each water using part of the site is analysed and improvements and KPIs are identified related to the specific need for each user. There are mainly three purposes of KPIs:

- **Control** of operations/processes to stay within certain limits
- **Reporting** for internal/external reports and benchmarking
- **Improvements** within the organisation

When designing a KPI it is important to consider aspects such as: what is the purpose of the KPI, who will use it and what information should it deliver. This means that there is a need for different KPIs to support each step in the process and directed to different stakeholders in the organization, e.g. a KPI designed to report annual water usage to management and environmental authorities will be different from a KPI used for process control.

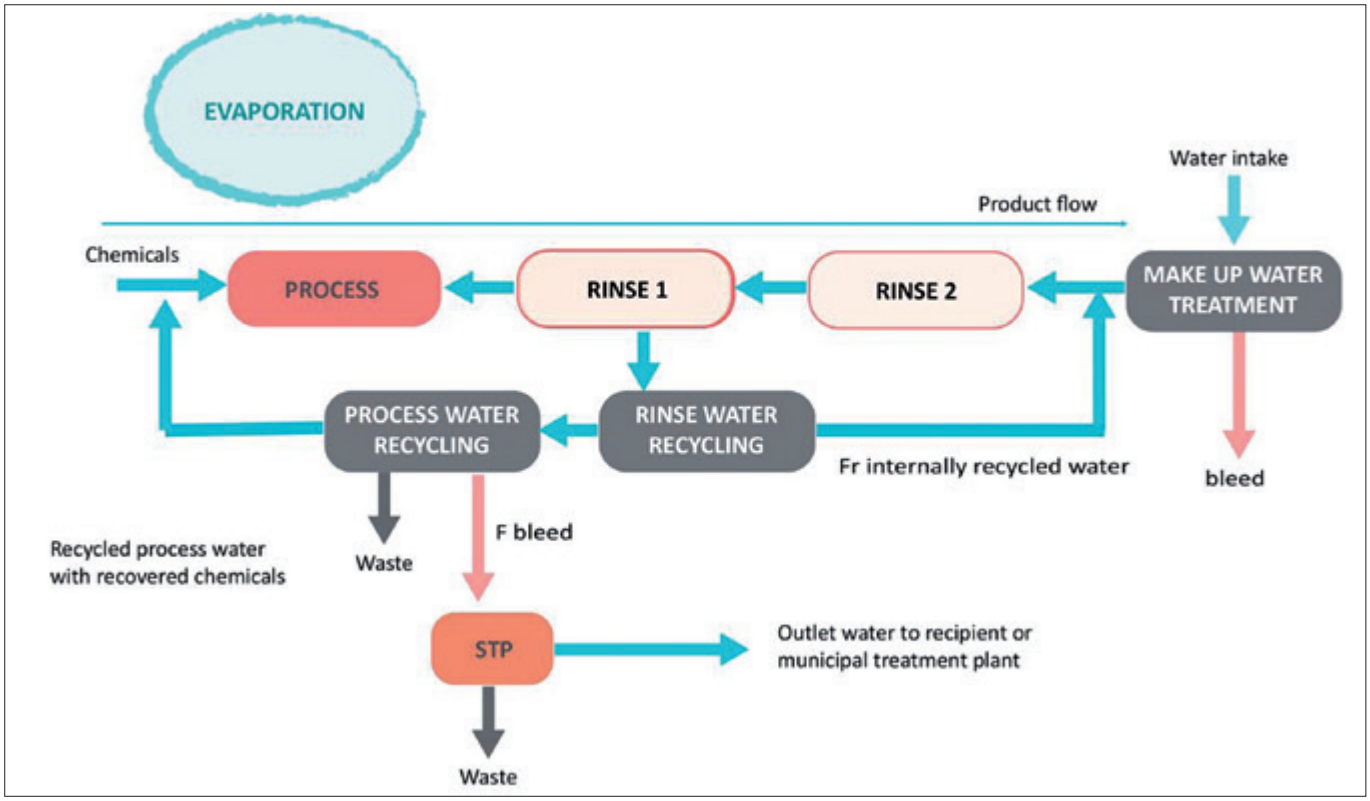

Figure 4: Example of a production process with high water usage. In the figure the light blue arrows are representing water flows with more or less contamination of process fluids, while the dark arrows represent flows with high amount of process chemicals.

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