Product report: KPI-based control of sustainability in business processes

Active Sustainability Optimization with Qualicision AI

Conserving resources has an enormous impact on improving sustainability in business processes. With the Qualicision-based optimizations integrated in the PSI software products, profitability and sustainability goals can be pictured at the same time. In this way, green KPIs can be integrated into the optimization of energy and production cycles. Active sustainability optimization becomes immediately possible, and AI methods of machine learning play an essential role here.

The optimization of energy and material flows in business processes of PSI customers is supported by a range of software tools that optimize both energy and production cycles. As both cycles are coupled by the interconnection of energy and material transformations, the optimization of the associated business processes not only holds an enormous sustainability potential, but also creates opportunities for direct, sustainability-oriented control of these processes. Figure 1 shows the energy and production cycle along which the PSI software tools operate.

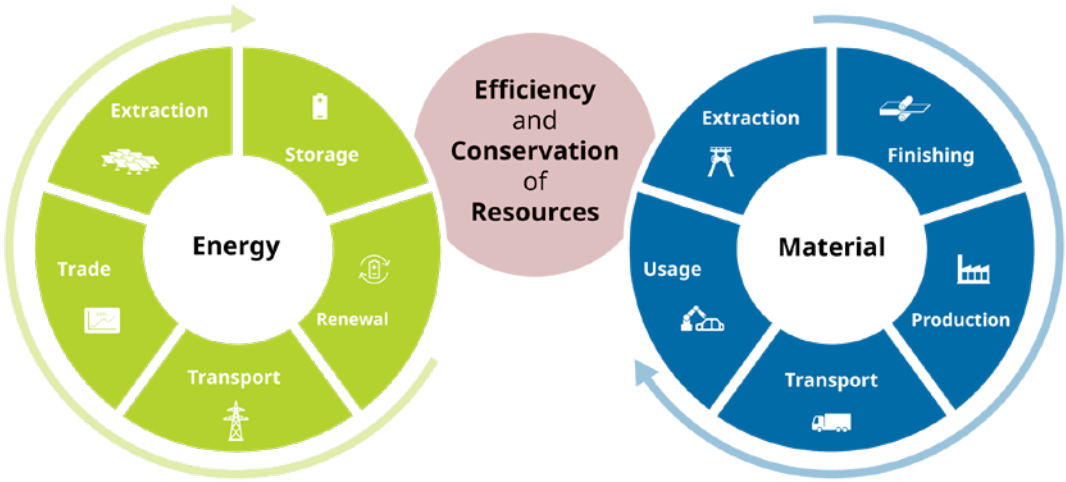

Figure 1: Sustainability cycles in energy and production management.

PSI Software Tools and Sustainable Cycle Systems

The energy cycle, for example, is home to software products such as PSIsaso, PSIgasguide, PSImarkets and PSIcommand, which optimize energy transport, energy trading and maintenance of energy infrastructures. The production cycle includes software products such as PSIpenta, PSIsequencing, PSIasm, PSImetals, PSIglobal and PSIwms, which either directly optimize production processes or support them via logistical functionalities. Integrating Qualicision AI technology into the mentioned software products, especially incorporating KPI-oriented optimization, generates the unique possibility of direct, active implementation of profitability and sustainability KPIs. The integration of Qualicision has already taken place in some of the PSI tools mentioned above. The integration into the other PSI tools is in progress.

Connection of Profitability and Sustainability KPIs

As an optimization logic for software-guided business processes, Qualicision offers the advantage of connecting technical and operational KPIs (Key Performance Indicators). With Qualicision, technical restrictions can be efficiently linked to any number of other KPIs. Among them are also those that stand for the sustainability of the processes. These can be indirect green KPIs aimed at conserving resources, as well as KPIs that map directly to the relation between original KPIs like capacity utilization, throughput or on-time delivery, and sustainability KPIs such as energy efficiency.

Machine Learning with Qualicision AI Recognizes Relations

Machine learning methods can be used to automate the recognition of interactions among KPIs and make them transparent (technical term “connoting” or “labeling”) from both profitability and sustainability perspective. The combination of the process data history and current process data allows the relations between profitability and sustainability KPIs to be qualitatively prepared for deci-

sion-support purposes (see Figure 2). The business process data which is qualitatively labeled makes it possible to better identify decision scopes associated with the current situation and to assign appropriate preferences to the KPIs. This systematically creates better decision-making bases for actively balancing profitability and sustainability KPIs, whereby sustainability KPIs can thus become profitability KPIs, as it were, and vice versa. The PSIqualicision software tool lays the basis for the active optimization of business processes according to green KPIs. Below are two examples of how already successful use cases can be further developed in terms of active sustainability control:

Sustainability Effects in Electrical Network Maintenance

Using a suitable Qualicision-based optimization as part of the PSIcommand software tool, the business process of electrical network maintenance could be improved to the extent that the same workload can be handled with an approx. 15 percent reduction in the use of resources. The mapping of travel routes to travel times, in conjunction with various other KPIs, was a key factor in the mentioned optimization. If travel times are mapped to travel distances and these are mapped directly to CO_2 KPIs, the processes can be thought of directly in terms of minimizing CO_2 emissions and actively controlled in terms of their sustainability.

Sustainability Effects by Qualicision-based Production Control

Comparable or even stronger effects can be achieved in connection with the optimization of production processes. The optimal calculation of production sequences is decisive for the economic efficiency of the production processes. Here, too, these optimizations can be further developed and made controllable with regard to harmonizing production with the availability of sustainable energy. Further aspects such as the harmonization of production goals and energy usage goals, the coordination of setup processes with energy-conscious ramp-up strategies for machines and systems, can also be mapped and controlled here via KPI systems.

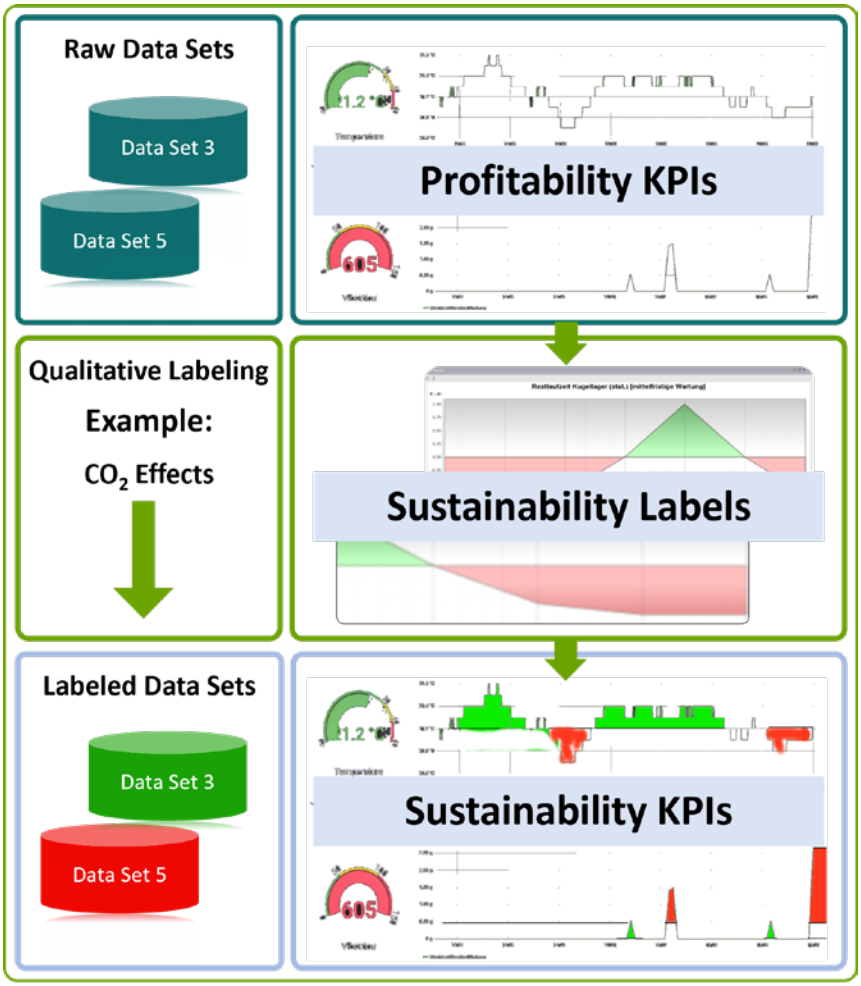

Figure 2: Sustainability-oriented labeling with Qualicision.

Active Sustainability Control by Green KPIs

Not only the described use cases show that direct and active control of business processes with sustainability KPIs is possible. Field-tested PSIqualicision is the tool for modeling KPI systems that combine classic profitability and sustainability KPIs. Put simply: Each profitability KPI can have a sibling KPI in the form of a (green) sustainability KPI. The advantages of the machine-learning connection of the resulting relations for the active sustainability-oriented control of business processes are obvious and will play an increasingly important role in the future.

PSI FLS
Fuzzy Logik & Neuro Systeme GmbH
Dr. Rudolf Felix
Managing Director
felix@fuzzy.de
www.qualicision.de