BIOENERGIESYSTEME GmbH
Your partner for energy utilisation from biomass and energy efficiency
Research • Development • Engineering

Quality management for biomass heating plants ("QM Holzheizwerke")

The design and construction of biomass heating plants, in particular plants supplying local and district heating networks, is a technically ambitious project. Such heating plants must be regarded as a long-term investment with relatively high capital and technical requirements. Professional project management and technical planning are therefore essential prerequisites for the successful implementation and operation of biomass heating plants.

Quality management is designed to constitute a substantial component of project management and examine both the technical and the economic data of each project. It ensures that the biomass boilers achieve a high utilisation rate and that the heating plant and the local and district heating networks are designed properly to guarantee efficient and cost-effective operation.

The "QM Holzheizwerke" programme is part of the klima:aktiv initiative launched by the Austrian Ministry of Agriculture, Forestry, Environment and Water Management with the aim to achieve a sustainable reduction in CO_2 emissions in Austria. "qm heizwerke" aims in particular at increasing the efficiency of biomass heating plants focusing on optimised planning and operation. In this context, continuous automatic data acquisition is essential to immediately recognise and correct any deviations from the ideal condition.

The integration of a quality management process has been obligatory since 1 April 2006 for biomass heating plants of a boiler capacity (total) of 400 kW_{th} or higher and/or a network length of 1,000 m or more. This obligation applies to both new and expansion projects which apply for a capital investment grant from the Austrian public finance bank Kommunalkredit AG. The corresponding values apply analogously to the heating capacity of biomass combined heat and power (CHP) plants.

A quality manager (QM) must be appointed, who will consult and assist the plant owner and the planner during the planning and implementation period.

Alfred Hammerschmid of BIOS BIOENERGIESYSTEME GmbH is a quality manager with long years of experience in energetic biomass utilisation.

The quality management system for biomass heating plants and district heating networks is based on the system compiled by the international "QM Holzheizwerke" working group and implemented in Austria by AEE INTEC. BIOS BIOENERGIESYSTEME GmbH contributed its design and engineering expertise in biomass heating and CHP plants to the preparation of application guidelines for the new quality management system.

Hydraulic control loop in the heating plant

Laying of district heating pipes

Aims and quality requirements of "QM Holzheizwerke"

The substantial aims of the quality management system cover the professional design, planning and construction of the biomass plant and the district heating network. The most important quality aims are:

- reliable, low-maintenance operation
- high efficiency and low heat distribution losses
- low emissions at all boiler operating conditions
- precise control system adapted to different load conditions
- long-term profitability of the project

In order to achieve these aims efficiently the following substantial quality requirements have been defined:

- the heat demand data must be determined plausibly according to the valid rules and must be represented in the form of a load characteristic and an annual heat demand line
- the connection density of the district heating network must exceed a minimum value
- the biomass boiler in a bivalent system must be designed in such a way that it achieves the high utilisation rate demanded by "QM Holzheizwerke"
- optimised waste heat recovery in the district heating plant and optimal layout of the pipe network to enable the high annual utilisation rate of the entire heating system specified by "QM Holzheizwerke"
- defined standard solutions must be used for the hydraulic integration and the pertinent measuring and control system
- the net volume of the biomass fuel storage must not be oversized and must be designed in accordance with existing fuel resources
- the selection of the biomass fuels should be based on the detailed classification by "QM Holzheizwerke"

Project workflow with milestones

The quality manager guarantees that the quality management system will be established, applied and maintained as specified. He advises the owner and the planner of the project and is responsible for quality specification, quality control and quality inspection.

The quality management system divides each project into 6 phases. The owner, the planner and the quality manager must record the current status and further quality relevant project contents in five milestones.

Milestone 1 is already integrated in the preliminary planning phase in order to start the quality specification process as early as possible. Milestones 2 (at the end of design planning), 3 (at the end of tender planning) and 4 (after erection and acceptance) serve for quality inspection and quality management during the project. Thus it is guaranteed that variations in quality are recognised and corrected in time. Milestone 5 forms the conclusion of the quality management system after at least one year of plant operation optimisation.

Quality management expertise at BIOS

BIOS can and will make an important contribution to the quality assurance of new projects. Its quality manager Alfred Hammerschmid has long years of experience in the planning, implementation and optimisation of biomass district heating and CHP plants. The expertise in monitoring and optimisation (BIOS can also draw on extensive measuring equipment and specially developed software programs for data evaluation and validation, e.g. DATEVAL® 1.0) gathered in a wide range of successfully implemented projects provides an outstanding potential for the integration of quality management in the establishment and expansion of biomass heating plants.

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Exterior view of a biomass heating plant