TT5: QM system basics and extension
Webinar, 23. 11. 2021

QM system basics

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CONTENT

QM Heizwerke

What is it and why QM / achievements

QM process basics

Documents / tools / project types

QM HEIZWERKE – WHAT IS IT ?

- Quality management program for biomass district heating plants (in Austria)
  - Improve the quality and efficiency of biomass district heating plants and networks
  - Professional planning and execution
  - Reliable operation with low maintenance efforts
  - Low emissions in all operating conditions
  - Sustainable long term operation

klimaaktiv

Federal Ministry
Republic of Austria
Climate Action, Environment,
Energy, Mobility,
Innovation and Technology

- Funding only for high quality plants
- Optimisation of existing plants
- Know-How-Transfer

QM Biomass DH Plants

www.qm-biomass-dh-plants.com

WHERE DOES IT COME FROM?

- Made in Switzerland
  - invented 1998
  - Since 2005 development supported by Austria, Germany

www.qmholzheizwerke.ch

New member from Italy

APE Agenzia Per l'Energia del Friuli Venezia Giulia www.ape.fvg.it

WORKING GROUP Quality Assurance Wood Combustion

QM Qualitäts-Management Holzheizwerke

Switzerland:

--- Holzenergie Schweiz, with financial subsidy of the Federal Authority for Energy

Germany:

--- College for Forestry in Rottenburg

--- C.A.R.M.E.N. (Centrales Agrar-Rohstoff-Marketing- und Entwicklungs-Netzwerk e.V.)

Austria:

--- AEE - Institute for Sustainable Technologies (AEE INTEC)

https://mobile.twitter.com/entrain_project

WHY QUALITY MANAGEMENT?

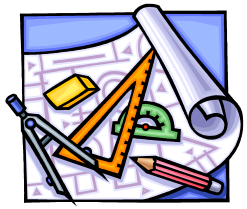
- Long-term infrastructure projects with high investments
- Planning significantly influence project success
  - Dimensioning of plant and network
  - Efficiency / fuel demand
  - Plant durability and operating costs
  - Development of supply area
- Avoid stranded investments
  - Ensure effective public funding
- Consequent monitoring and optimization
  - Technical, economical and administrative
- Don´t make the same mistakes again and again
  - Use proofed technology and concepts
  - Ensure state of the art / state of knowledge

JÜRGEN GOOD
Engineering office Verenum,
head of the Quality Assurance Wood Combustion:

"Biomass heating plants with heating networks are long-term projects with high investment needs. Thus, a professional project and quality management is essential in order to realize and operate plants successfully."

COST RELEVANT PROCESSES

Concept & planning	Detailed engineering	Procurement
70%	20%	10%



Source: B. Enzensberger (Q-manager & planner in AT)

Correcting planning mistakes is
- difficult (sometimes impossible)
- expensive

GENERAL CLAIMS

- Biomass DH must become better and cheaper
  - cheap planning? low investments? low operation costs?
  - Low HEAT GENERATION COSTS
- Apply systems that improves quality (continuously)
- Professional conception, planning and implementation
  - Know-how, experience, “second opinion”,…
- Financial support only for high-quality systems
  - Subsidies must be sustainable in the long term
  - Subsidies require justification

QUALITY OBJECTIVES

- Reliable, low-maintenance operation
- High utilization ratios and low distribution losses
- Low emissions in all operating conditions
- Precise and stable control systems
- Ecological and economic sustainability

→ For the whole lifetime

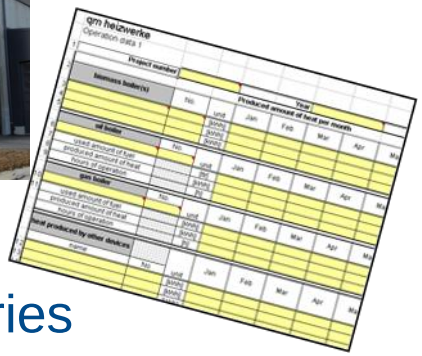
→ QM helps by defining and checking the quality of planning and project

ADDITIONAL OBJECTIVES

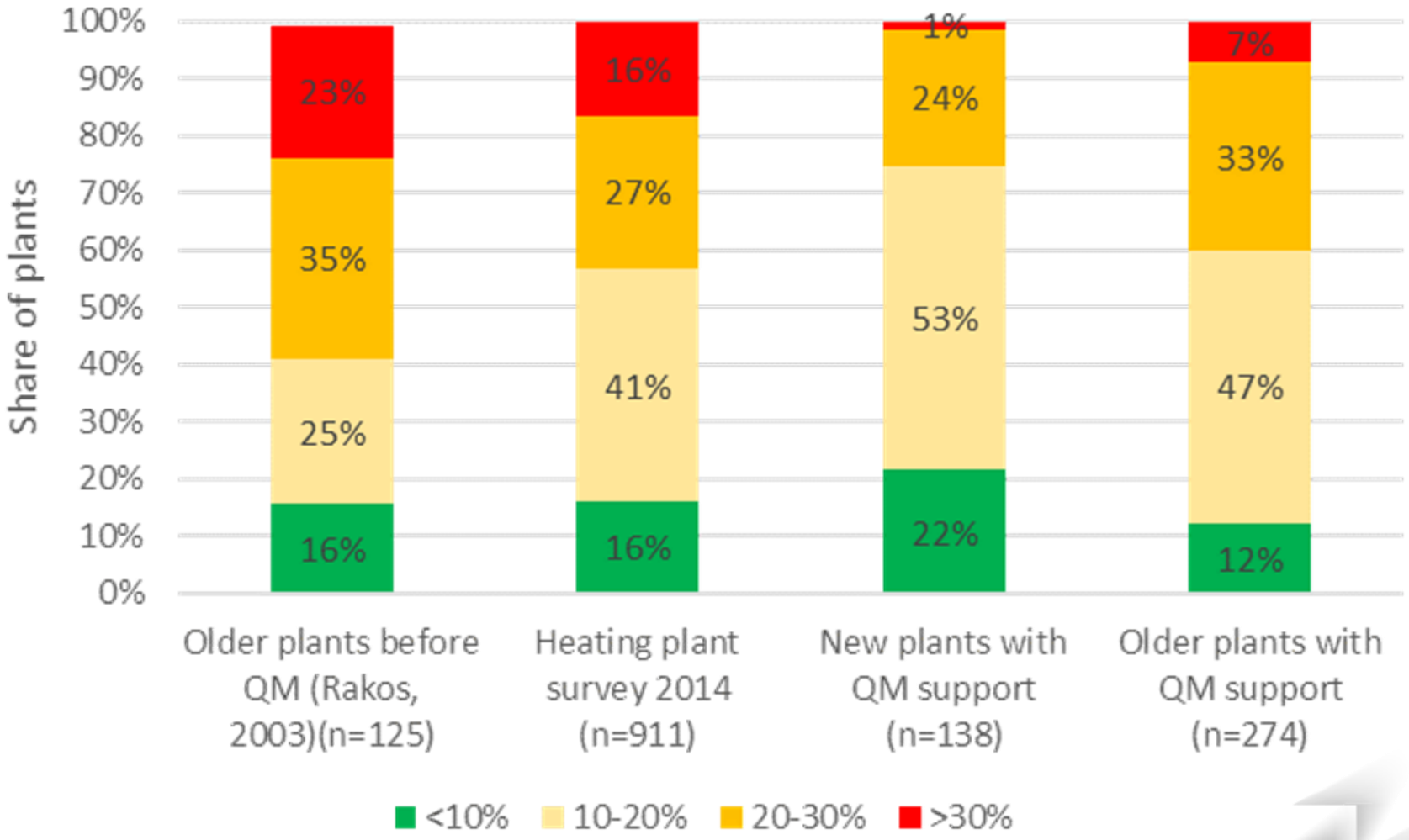
- Independent consultation to…
  - plant owner, investor
  - planner
- Learning from the mistakes of others
  - We do not want to make the same mistakes again
  - QM and Q-managers are open for new and proven solutions
- QM does not intend to cause much additional work

ACHIEVEMENTS OF QM HEIZWERKE IN AUSTRIA

- Standardised quality requirements
- Same info and documents for all project participants (database)
- Data of Austrian biomass heating plants
- Efficiency of plants has improved
- Training of plant designers and operators
- Compulsory monitoring and optimisation
- Obligatory annual operating reports
- Close cooperation with funding agencies and ministries
- Possibility to contribute to national heat strategy

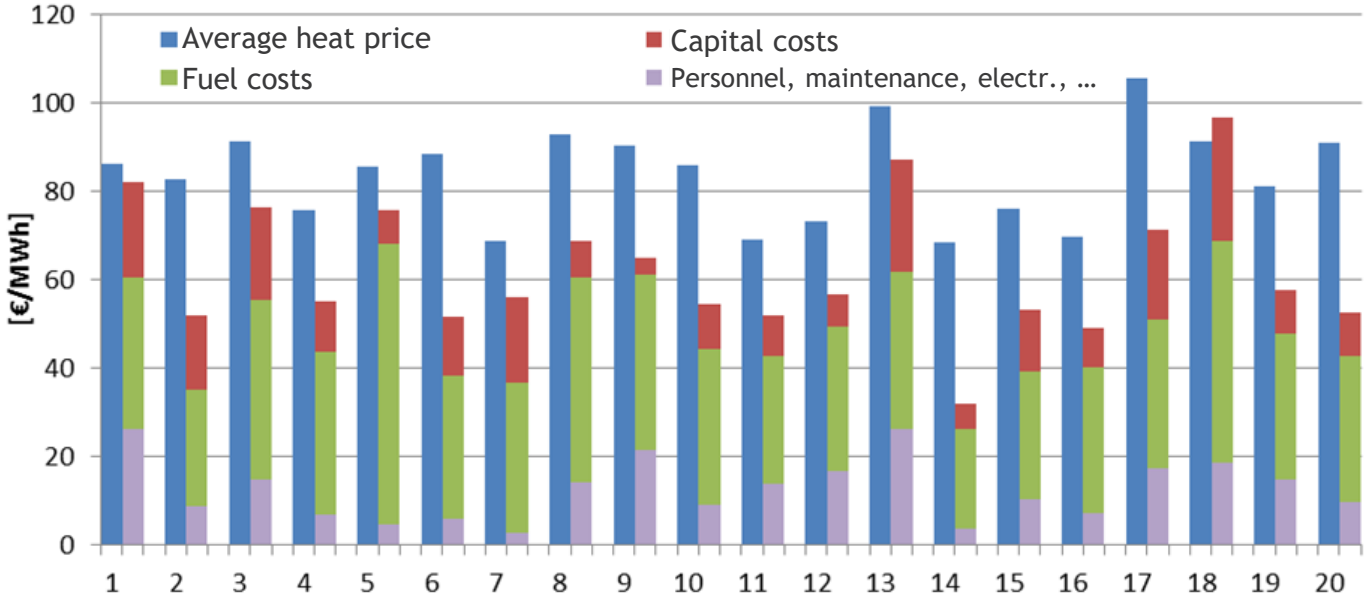


REDUCTION OF HEAT LOSSES



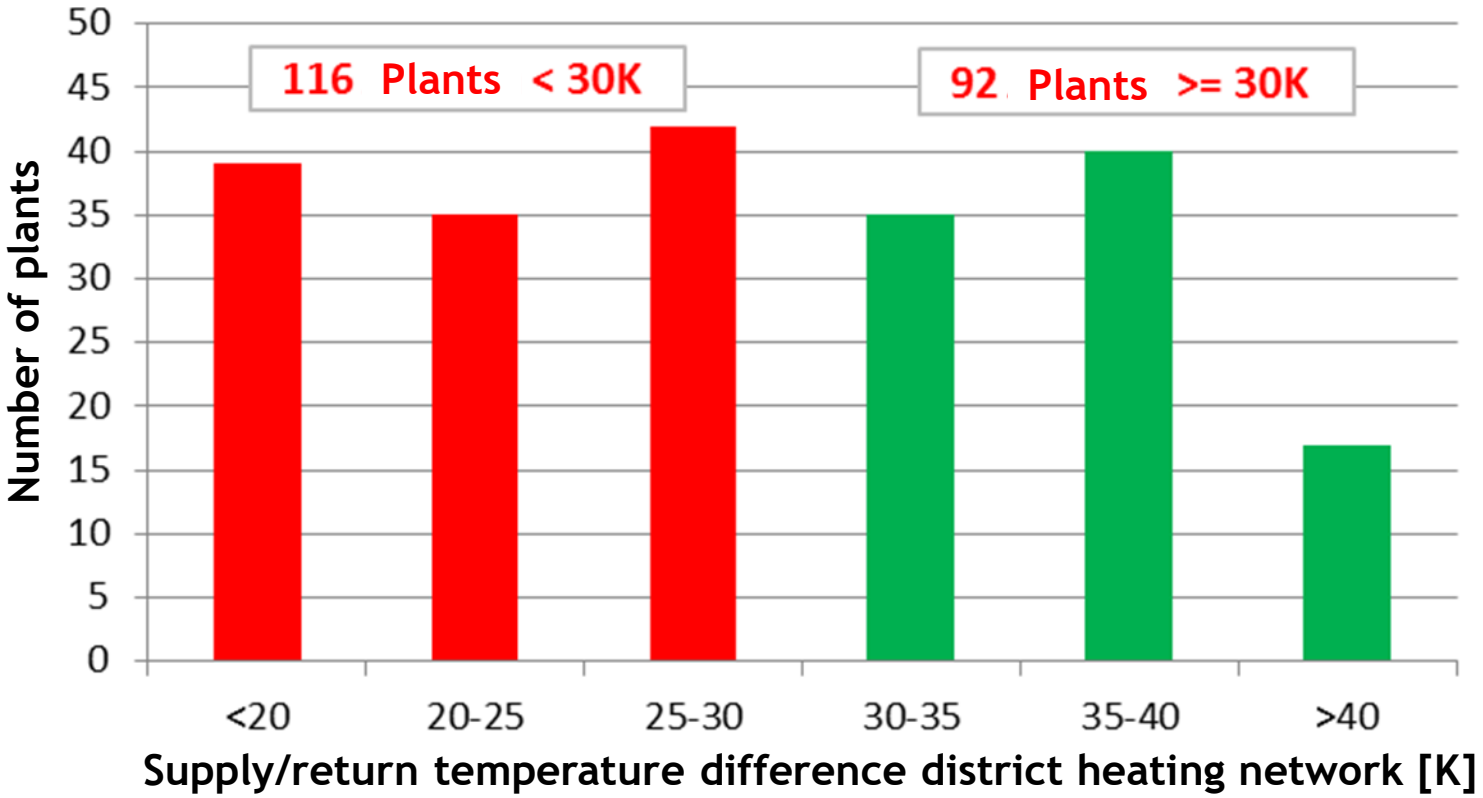
COMMON MISTAKES

- Insufficient knowledge of basic data during planning
  - Heat demand and heat capacity of the heat consumers
- Heat sale lower as expected
- Heat generation costs higher than expected



Heat generation costs compared to heat prices (averaged inkl. basic and energy charge); Evaluation by AEE INTEC

COMMON MISTAKES



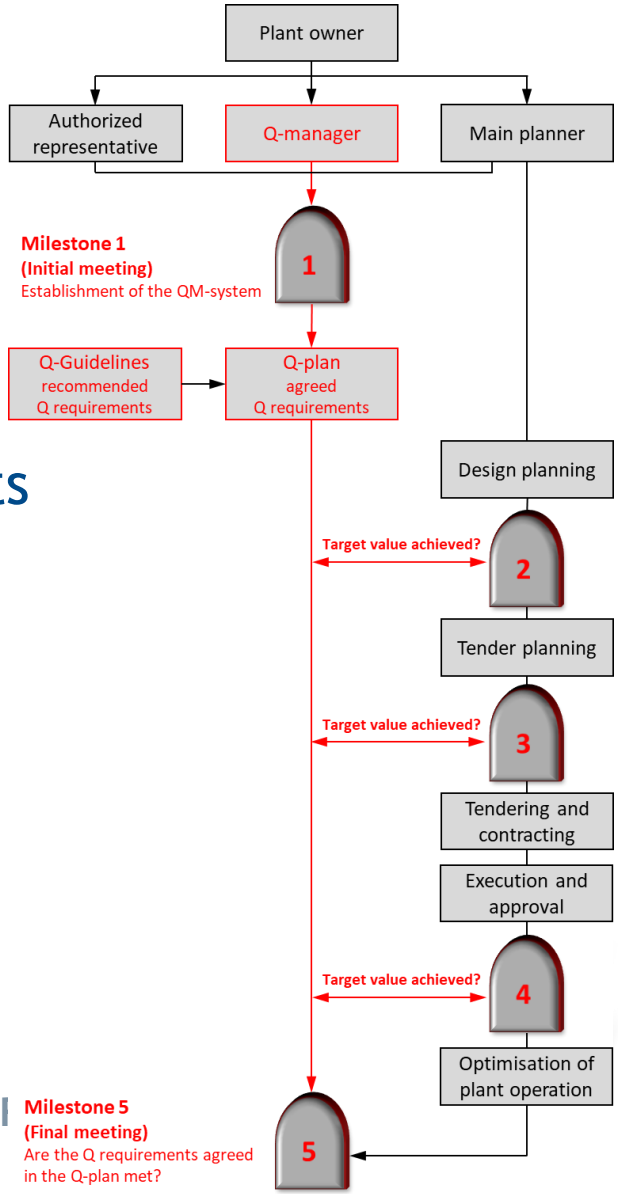
Evaluation by AEE INTEC based on data from the QM database

COMMON MISTAKES

- Plant owner/investor ask for the impossible
- Oversized boilers, oversized network pipes
- Too extended (wide-spread) district heating networks
- Unclear/undefined control strategy
- Insufficient measurement instrumentation (sensors, ...)
- Unsuitable hydraulic installations
- Emission problems during low load operation
- Frequent technical faults/malfunctions
- High maintenance costs, reduced lifetime
- Insufficient plant documentation

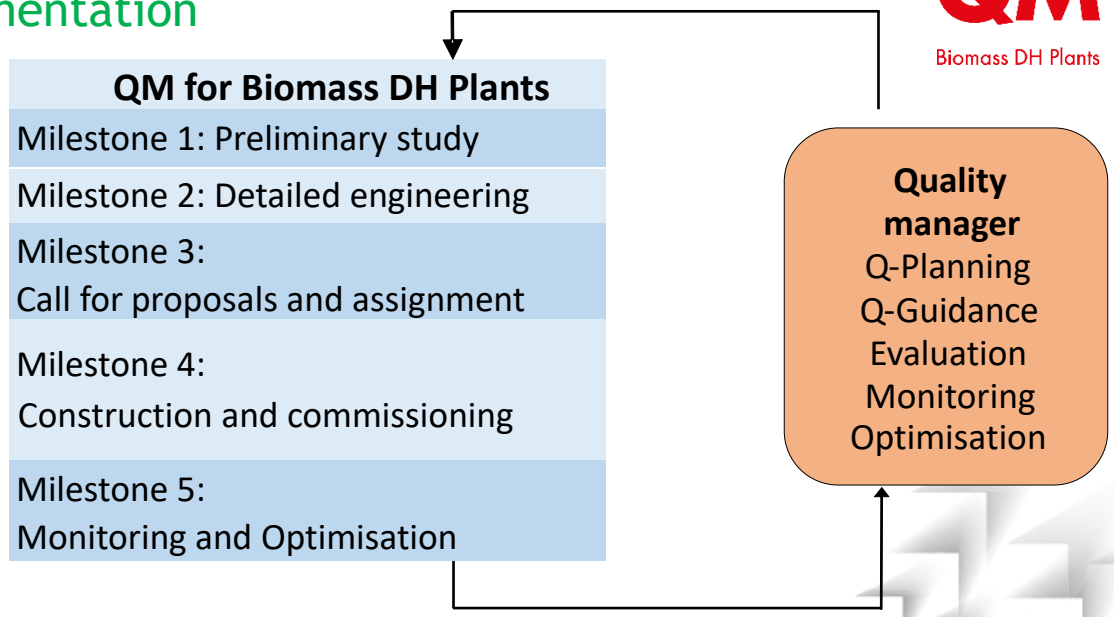
BASIC PRINCIPLES OF QM FOR BIOMASS DH PLANTS

- Definition of a suitable planning process
  - Only high quality planning leads to high quality plants
  - High quality planning pays off immediately
  - Tasks and responsibilities !!!
- Definition of required data and documents
  - Basic data of the plant design
  - Basic data to determine the heat demand
  - Key figures (Benchmarks)
  - Documents and what they should contain!
  - Plant documentation
- Defined quality (QM) process



BASIC PRINCIPLE OF THE QM PROCESS

- Defining the quality at the beginning of a project
  - We plan the quality, which we want to achieve
- Continuously check of the quality in each project phase
  - If deviations are detected…
    - … recommendation of corrective measures
    - … and their implementation



PROJECT TIMELINE

First project idea
and Pre-feasibility

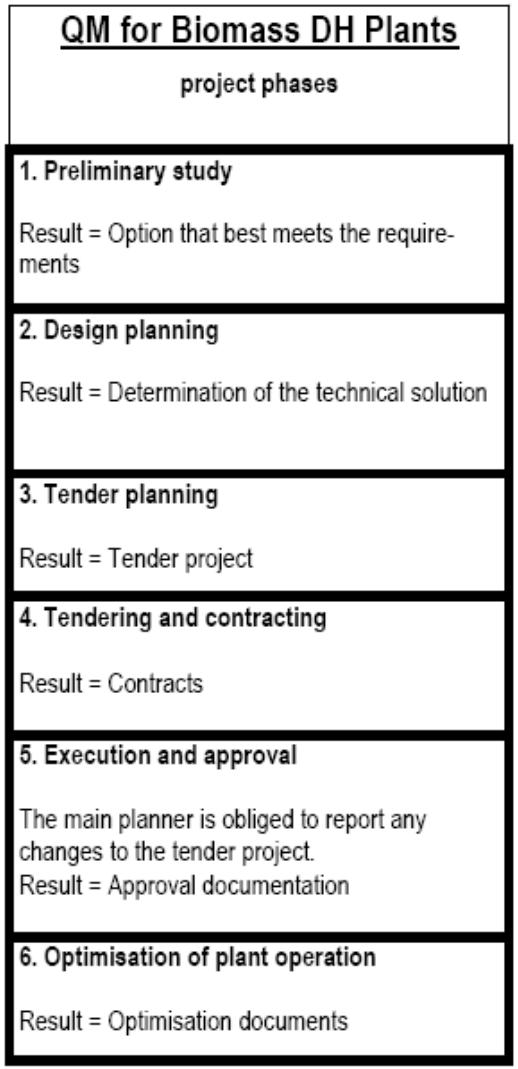
Decision to continue project
(at latest here: contracting of planner)

Contracting of heat consumers

Technical design fixed

Final investment decision
(Point of no return)

Commisioning of plant



Milestones

1

Start considering QM-guidelines !!

Awareness raising, know-how transfer, team building

2

Apply QM before main decisions are made

3

4

5

Don‘t forget to finsh the process!

PUBLICATION SERIES OF QM-HOLZHEIZWERKE®

- Q-Guidelines (with q-plan)
- Planning handbook (revision for 3rd edition & translation ongoing)
- Standard hydraulic schemes part 1 and part 2
- Standard tender for wood boilers

Defines QM process + Q requirements

Support for planning

Integral part of QM process

Support planning/tendering

Q-GUIDELINES
STRUCTURE AND CONTENTS

Preface and brief introduction to QM

A Project participants

B Establishment of QM for Biomass DH Plants (= MS1)

- Tasks and duties: Q-manager, main planner, plant owner
- Recommendations for funding agencies

C Project structure with milestones

D Services plant owner

E Services and Q-requirements main planner

- Achievements in the individual milestones (MS1 – MS5)
- Q-requirements

F Fuel definition

Glossary

Literature

Annex + Checklists + document templates

Summary of QM process
Required data, documents and quality criteria

QM PLANNING HANDBOOK

- Valuable knowledge basis
- In accordance with QM
- Support for planer,

Q-managers, operators,…

Final version of English QM Planning Handbook coming soon!

Overview

QM AND DIFFERENT TYPES OF PROJECTS

- New plant
  - Standard QM process, QM mini
  - Simplified version according to Q-guidelines (for smaller plants)
- Plant enlargement
  - Standard QM process, simplified version, QM mini
- Optimisation, modernisation, revamping, refurbishment
  - Depending on the project and actions taken!
- CHP and special plant and/or ownership configurations

OPTIMISATION VS. REVAMPING

- There is no strict definition – this is a guideline
  - In AT this is depends on funding schemes as well
- Optimisation (modernization)
  - Adjustment of control parameters, control strategy
  - Minor adjustments of plant components (adding storage tank at max)
  - Optimisation of DH substations/consumer heating systems

  → Consider guidelines, quality criteria,... From QM

  → usually no full QM process
- Revamping or refurbishment (modernization)
  - Major re-investments due to end of lifetime
  - Major change of system configuration (due to various reasons)

  → Full QM process possible

HOW FLEXIBLE IS QM?

- Minimum standards must be met!
  - Quality of technical documents, completeness and plausibility of data
  - Suitable dimensioning of plant and network & plant configuration
  - We allow flexibility for future plant enlargement (if suitable plant configuration)
- It is hard to meet all requirements regarding heat demand assessment and consumer data
  - Even though it is highly important
  - Basic data for heat demand assessment (Detailed consumer data)
  - Determination of future heat sale potential
- NO flexibility regarding secured heat sale
  - Secured by contracts!

HOW FLEXIBLE IS QM?

- Standard hydraulic schemes & control strategy
  - Other solutions are possible, but they must be defined in detail
  - Insufficient control strategies are a common mistake!
- Basic plant instrumentation must be ensured
- Fuel quality must comply with furnace technology
  - Especially critical for small plants
- Q-requirements for fuel storage are flexible
  - Depend on fuel logistic concept
- Existing plants require more flexibility
  - Dimensioning and configuration can´t be changed easily
  - Shortcomings of instrumentation
  - In AT an “improvement requirement” apply for plants originally being built without QM
- More flexibility can be granted to highly skilled and experienced planners and plant owners

WHAT DOES QM NOT COVER?

- QM is focusing on
  - the planning process including the first operating period
  - technical issues
- QM does not directly address
  - Administrative issues and therewith related optimization (corporate form, management of plant, therewith related legal issues, insurance, billing,…)
  - Daily operating routines, practical operation strategies (fuel handling, furnace start-up,…)
  - Maintenance and regular system checks
  - Operation logbook
  - Customer relations
  - …
- However, do not forget that these issues are very important as well!

THANK YOU!

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