DELIVERABLE D.T3.5.2
SUMMARY REPORT

Extension of the QM system | Version n° 04/2022

D.T3.5.2: Summary Report on quality management system local implementation schemes

A.T3.5 Ensuring the quality of existing and new DH systems

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1. Introduction

The aim of activity 3.5 "Ensuring the quality of existing and new DH systems" of the ENTRAIN project is to adapt, update and implement the existing QM system “QM-Heizwerke” in the target regions. The system is well established in Austria, where it is mandatory to receive funding for biomass-plants above 400 kW and heat-networks over 1000 meters length. Therefore, the Austrian approach served as an example for the project partners.

This summary report contains the lessons learned by and the activities of the ENTRAIN project partners on their QM system implementation schemes. It is meant for dissemination to other regions, municipalities and institutions outside of the consortium.

The main focus of the activities was on a bottom-up and a top-down approach. The bottom-up approach aimed to introduce relevant stakeholders, i.e. plant operators, DH operators, planners and municipalities to the economic and ecological benefits of a QM-system to push voluntary implementation. To raise awareness, capacity building events were held. Networks and contact points for interested stakeholders were established. Tools and information materials were prepared and disseminated via the consortium and the established networks.

This approach was used by all the target regions. In Italy, Austrian project partner AEE-Intec trained 3 employees of Italian partner APE FVG as Q-managers. APE FVG prepared dissemination materials about the QM-system, worked to restore the reputation of woody biomass and district heating in the region and established a network of engineers and professionals in the field. They also supported municipalities with feasibility evaluations of biomass-plants.

In Germany workshops on the QM-system were held with multipliers from energy-agencies, who are working with heat suppliers and municipalities. In addition, a QM-Toolbox was translated into English and prepared for the other consortium partners. In Croatia, local and regional authorities form three counties participated in regular meetings and trainings about QM-Heizwerke, were informed about it and helped discussing the adaption of renewable energy sources in district heating networks. An information hub for citizens and relevant stakeholders was established by REGEA in the Energy center Bračak. Here, information materials like a summary of QM-Heizwerke and project documents in Croatian are available and disseminated. REGEA also disseminated these materials over their newsletter.

The top-down approach focused on the establishment of mandatory QM-standards based in legislation and regulations. As mentioned, this is the case in Austria. In the Italian region consultations on the topic with regional authorities are ongoing. In Germany, a top-down implementation was deemed unlikely. In Croatia, REGEA identified a number of recommendations and problems for the wider introduction of biomass-plants, and even presented these at the 5th working session of the Council of the President of the Republic of Croatia for Energy Transition in Vukovar.

2. Implementation of the QM system – Germany

Background and goal: QM Holzheizwerke is a project-related quality management system for wood heating plants for the production and distribution of space heating and hot water as well as process heat. In a defined project involving several companies, it intends to ensure quality requirements are specified and regularly checked. The system was developed by a transnational working group with partners from Switzerland, Austria and Germany and is being successively refined. The model for the dissemination of QM within the framework of ENTRAIN is the project partner country Austria, where the program is mandatory within the framework of environmental funding for all plants > 400 kW nominal boiler output or > 1,000 linear meters of network length. In the ENTRAIN partner region Friuli Venezia Giulia in Italy, the implementation of the QM system is well advanced. First Italian "Q-managers" are trained according to the Austrian model and APE FVG joined the QM working group. For Germany, there are currently contact persons for Q-supervision in Bavaria (C.A.R.M.E.N. e.V., Straubing) and in Baden-Württemberg (Rottenburg University of Forestry). The main objective of QM is a reliable, low-maintenance operation of wood-fired plants, a high degree of utilization and low distribution losses, low emissions in all operating states, precise control, and the sustainable economic efficiency of a heat network project. Therefore, the QM system defines requirements, e.g., for the determination of heat demand values for the creation of an annual duration or load characteristic curve, the minimum connection density to a network, a high utilization of the heat generator, the dimensioning of the fuel storage and the quality of the wood fuels in coordination with the plant technology. The QM Holzheizwerke system was originally developed for wood combustion plants > 100 kW. It defines important standards for this, but is not limited to it. In heating networks, RES are increasingly used in combination, such as wood energy and solar thermal energy. The defined Q-process or at least parts of it can and should also be applied here.

Top-Down approach: QM as a prerequisite for public subsidies. In the early days of RES technology market introduction during the 2000s, subsidies for the then very new technologies were at least partially tied to Q-supervision to ensure efficient plant operation and thus the desired effect of government support. At that time, the Ministry for Rural Areas (MLR BW) together with the Climate Protection and Energy Agency (KEA-BW) and the Forest Research Institute (FVA) were involved in the QM program for the state of Baden-Württemberg. Currently, Q-supervision during the construction or optimization of plants is voluntary and not linked to a possible subsidy from public funds. In 2014, the Rottenburg University of Applied Forest Sciences (HFR) joined the QM working group for the state of Baden-Württemberg. As another actor of the wood energy industry, the Holzenergie-Fachverband Baden-Württemberg (HEF) contributes practical experience to the QM system. In the Neckar-Alb target region, in addition to funding from federal programs, there is the possibility of receiving funding for heat network projects from the state funding program for energy-efficient heat networks in Baden-Württemberg (see D.T3.4.1 Local financing and support tools). Following the Austrian and Swiss model, a possible strategy for the nationwide implementation of quality management for RES heating network projects would be mandatory monitoring as a prerequisite for the retrieval of (state) funding. However, this requires the appropriate political framework conditions. The implementation of this "top-down" strategy does not currently appear promising for the Neckar-Alb target region.

Bottom-up approach: Voluntary quality management in project engineering and plant operation. In Germany, there are many positive examples of so-called bioenergy villages that supply themselves with renewable heat based on locally available biomass. The use of wood energy is also becoming increasingly attractive for the provision of climate-neutral process heat in industry. However, both municipalities and companies face challenges when investing in renewable energy technology. On the one hand, the general conditions are favorable; good subsidy quotas and CO2 pricing make the construction of new plants attractive. However, planning and operation of wood combustion plants, especially compared to the established supply based on natural gas or oil, are more demanding and other aspects have to be considered. A major risk for builders and investors is that mistakes in the planning can hardly be corrected afterwards and have a negative impact over the entire operating time. Examples include undesirable emissions/exceedance of limit values, increased maintenance costs, reduced efficiency and thus poorer cost-effectiveness. On the other hand, there are high investment sums and requirements for obtaining a building and operating permit (e.g. air pollution control). The introduction of a QM system as part of professional project management can help to overcome these challenges.

The primary goal during the ENTRAIN project was therefore to inform stakeholders in the Neckar-Alb region about the existing QM program and the available information materials and tools. Existing documents from the QM program were translated from German into English and are now available to a wider, international audience in the form of the ENTRAIN QM Toolbox. In addition, the focus was on demonstrating the benefits of voluntary Q-support for all project stakeholders. **Capacity building and dissemination activities** were carried out in the form of the Local Trainings with a dedicated session on the QM, targeted at multipliers from climate and energy agencies who consult municipalities and companies. Another workshop covering basic principles, application areas, quality requirements and advantages of QM support were held in December 2021 in cooperation with HFR. The target group were young professionals and engineering students.

3. Implementation of the QM system – Italy

APE FVG, within the ENTRAIN project but also autonomously, was active on multiple activities, each one targeting a different aspect of the regional system. Here, the activities are presented by type/target:

- Restore the reputation of woody biomass, promoting the cascade use of wood and the sustainable management of local forests. APE FVG carried out a study on the regional availability of wood that can be sustainably retrieved locally. Moreover, the possible impact on the local economy was estimated, in terms of earnings for the municipalities (from the exploitation of their forests), local job creation and local circulation of funds that would otherwise leave the country to reach some fossil fuel supplier;
- Similarly, it was necessary to refresh the image of district heating, promoting the competitive aspects of such technology and its higher sustainability with respect to multiple small decentralized systems. In fact, in the past years some of the few plants built in the region were badly planned, resulting in a burden for the administrations rather than a strength. Moreover, these plants resulted in a notable waste of public funds. APE FVG presented the Austrian model, with over 2300 plants and more than 3400 km of grid

managed following the QM principles and producing added value for the local communities;

- Three employees of APE FVG attended a Q-Manager training delivered by the Austrian colleagues of AEE Intec. The training was held over 4 days, two in March 2021 and two in September 2021, in two different locations in FVG. Besides that, multiple online calls allowed the new Q-Managers to go deeper into the documentation, process and duties of the QM approach. Moreover, it was possible to discuss about the different projects active in FVG and have a more experienced point of view;
- APE FVG became the first Italian member of the international QM working group (ARGE). ARGE includes partners from Switzerland, Austria and Germany. In 2021 the annual ARGE meeting was held in Udine. During these meetings each country updates the others with the activities carried out during the year, Q-documents are reviewed and the strategy for the coming years is presented. Being part of this official group is surely making APE FVG image as promoter of the QM system stronger;
- APE FVG developed a detailed and modern graphics for QM, with templates for future documents to be disseminated and presentations to be used in seminars. Ambiente Italia was also supported in the translation of the technical documents into Italian. Moreover, APE FVG is working to officially register the QM logo for Italy and is developing the QM Italian website, where all the documentation will be accessible. Last, APE FVG developed a promotional video for QM;
- APE FVG delivered free consultancies to support municipalities in evaluating the feasibility of several plants according to the QM principles, always stressing the importance of such approach;
- APE FVG established contacts with some associations of engineers and professionals to offer training sessions and courses focused on the QM system. Moreover, APE FVG will take part in Progetto Fuoco, the most important Italian fair on biomasses, in February 2022, where it will present the QM to interested stakeholders at national level;
- All the aforementioned points contribute to strengthen the position of APE FVG and the reputation of the QM when it comes to discuss with the Regional Authority about the official adoption of QM in the funding regulation. The consultation is ongoing and there is the actual possibility that the QM will be adopted in the regulation.

4. Implementation of the QM system – Croatia

ENTRAIN's main objective is to promote structural cooperation between public authorities and key stakeholders at transnational level and to build-up skills and know-how for a systematic, holistic and efficient planning of small DH systems within five target regions (Austria, Croatia, Germany, Italy and Slovenia), based on renewable heat sources (solar, biomass, waste heat, heat pumps and geothermal). One of the outcomes of the project Entrain is adaptation and adoption of the existing Austrian quality management system "QM Holzheizwerke" in at least three of the target regions. This system allows quality management during all phases of planning, financing, design,

construction, commissioning, optimization and management of district heating plants powered by renewable energy sources.

ENTRAIN covers three Croatian counties: Krapina-Zagorje County, Zagreb County and Karlovac County, stretching through central Croatia and surrounding Zagreb from northwest to southwest.

From the beginning of the project, representatives of local and regional authorities were closely involved in the project activities, e.g., by contributing to the RSAG meetings, participating at trainings. During these meetings and events, also strengths and weaknesses as well as potentials and challenges for the improvement of existing and the elaboration of new national and local strategies and policies to support the use of renewable sources in small district heating networks.

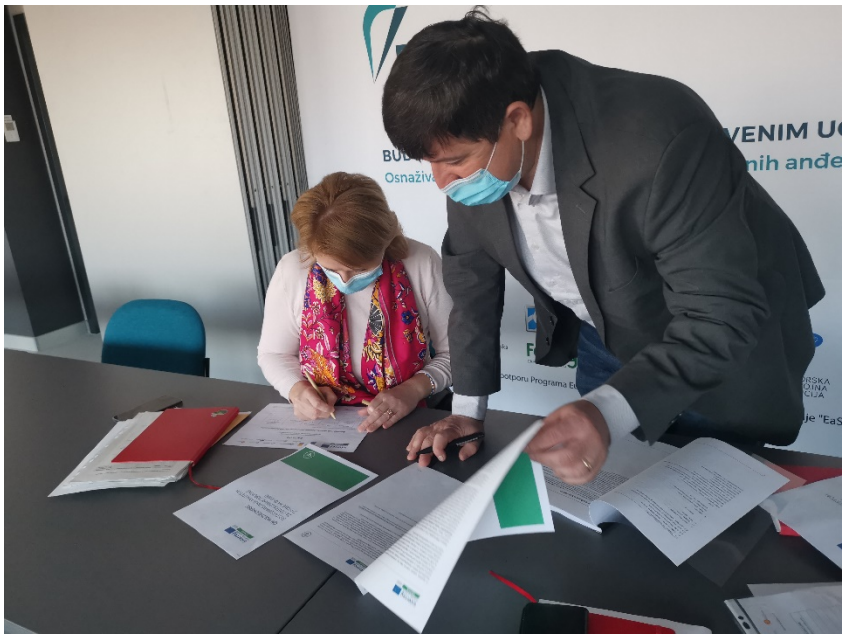
In addition to the strategic documents and laws at the national level, the counties in the targeted area have prepared their development strategies and Sustainable Energy Action, which also address energy efficiency and RES application in their respective area. Based on the development strategies and action plans, it is evident that the counties in the target area are continuously thinking and working on activities to increase energy efficiency in all segments of society and to encourage local community to use RES for their own energy production.

The representatives of the target communities in Croatia have been continuously informed about the importance of the QM standard in giving quality, limiting emissions and allowing public and private bodies to have better and sustainable plants, both economically and environmentally, in the long term.

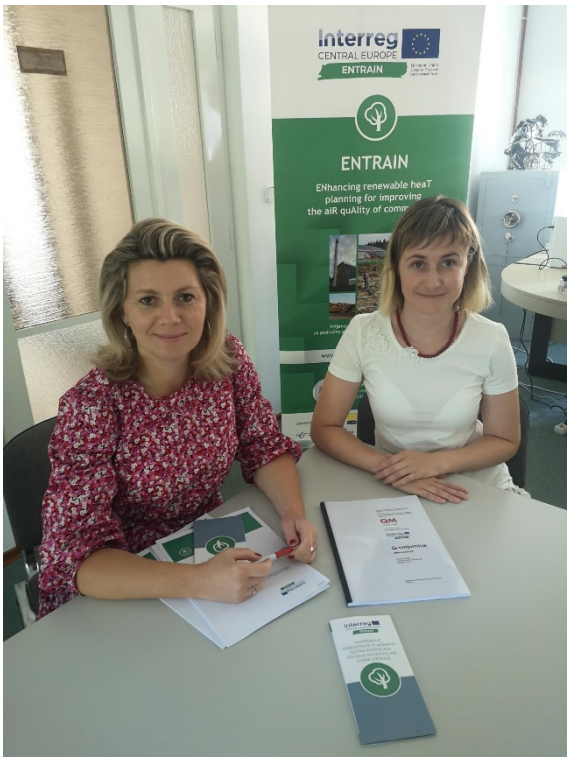
Through several meetings conducted, REGEA informed the target counties about advantages of the QM system to create acceptance and confidence and guide the authorities towards interdisciplinary approach in QM development an towards a planning of smart energy systems through understanding technology, economic and institutional problems, barriers and questions as well as presenting the methods for solving these barriers.

Currently in Croatia in general, the construction of a wood biomass district heating system does not have a quality standard to refer to, despite the individual components of this complex system (woods, wood chips, technical components, producers, plant designers and managers) have their own certification standards and technical regulations to refer to. This lack is one of the main causes of the construction of unsustainable plants in the medium and long term, both from an economic and environmental point of view.

Below are some photos from meetings with local authorities to get acquainted with the QM system.



Picture 1: Former Deputy Perfect of Krapina-Zagorje County and Member of ENTRAIN RSAG, Ms. Sanja Mihovilić looking at QM document
Source: REGEA 2021.



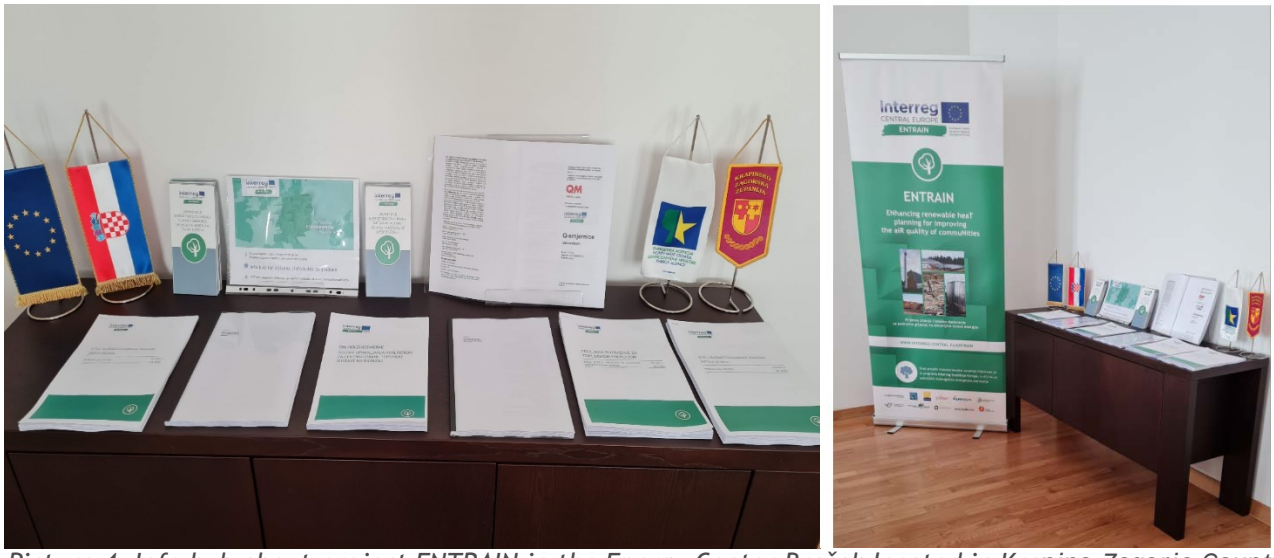
Picture 2: Introducing the QM to the Head of the Municipality of Krapinske Toplice

Picture 3: Presenting the QM to the Head of Department of Urban Planning and Environmental Protection in the City of Velika Gorica

Source: REGEA 2021

Since relevant information about the potentials of the use of the renewable energy sources in small district heating (DH) network is still lacking in target regions, REGEA established info hub

for stakeholders and citizens. Citizen's Info Hub is operated by REGEA in one of three local offices in Krapina-Zagorje County, City of Zabok. The info hub is located in the Energy center Bračak, hub is equipped with various project and promotional materials, which are prepared and disseminated within the Entrain project, such as project flyers in Croatian language, Initial QM Handbook, QM Holzheizwerke Guidelines in Croatian language, Summary of the QM Holzheizwerke in Croatian language, T2.2 Country specific planning guidelines for small DH in Croatian language, Annex to D.T2.2 Planning Guidelines for Small District Heating in Croatian language, Regional action plans in Croatian language and D.T1.3.2 Renewable heat potential assessment for the target regions in Croatian language and QM leaflet.



Picture 4: Info hub about project ENTRAIN in the Energy Center Bračak located in Krapina-Zagorje County Source: REGEA 2021.

Today the Energy Center Bračak Manor is used as central place for organizations, companies and institutions interested in the renewable energy as well as small and medium companies (SME) from other sectors.

REGEA also made a short summary about QM Holzheizwerke, describing how the system works, the goals and advantages of the system and provided contact of national coordinator of the ENTRAIN project in Croatia which users can contact for more information. REGEA has been continuously working on the communication and dissemination of project activities and results at a local, and regional level in order to raise the awareness among the citizens and policy makers and to increase the usage of renewable sources in Croatia. REGEA published the summary about QM Holzheizwerke in the REGEA newsletter with a link to the full version of QM Holzheizwerke Guidelines in Croatian language. The article can be found at the following link: http://regea.org/kako-se-nesto-moze-na-primjeru-austrije-i-projektu-entrain/ The newsletter was sent to 240 recipients.

In addition to the aforementioned activities, the continuous sharing of project materials and lobbying for the project objectives by the hub will spring up the idea of sustainable heating and cooling (efficient, economically resilient, clean and climate-friendly) among the citizens of target regions and will lay the ground for project realization in the near future. Info hub will work during the whole lifetime of the ENTRAIN project and beyond.

REGEA collect all feedbacks from the QM meetings in order to prepare a set of recommendations for national and regional authorities and financing institutions concerning the creation of favorable

frameworks, conditions and support instruments for the development of district heating based on local renewable energy sources. This document - Guidelines for Encouraging the Modernization of Central Heating and Cooling Systems were presented at the Council for Energy Transition of the President of the Republic of Croatia to incorporate these guidelines into the relevant legal framework that regulates this area in the Republic of Croatia. The application of the proposed recommendations will enable efficient and successful modernization of central heating systems and development of central cooling systems in the Republic of Croatia. The guidelines were adopted at the 5th working session of the Council of the President of the Republic of Croatia for Energy Transition in Vukovar, on 18 June 2021. The purpose of this document is to provide guidance in the following sense:

- Emphasize the importance and positive impact of district heating systems and cooling on the process of decarbonization of urban areas;
- Identify the main obstacles in the implementation of projects for the modernization of the heating and cooling sector;
- Propose measures and mechanisms to remove identified barriers.

Although the importance of district heating systems is formally recognized in European and Croatian strategies and laws, in practical and operational terms, Croatian legislation has a disincentive effect on them. District heating systems face a number of problems in the current legislative framework:

- Users are enabled to individually separate from the district heating system at the level of individual housing units, which often has negative consequences for the rest of the users and the entire system;
- Investors are allowed to freely choose the energy supply system for heating and domestic hot water preparation even if the facility is located on the existing route of the central heating system;
- Regulation of energy and energy prices often puts district heating systems at a disadvantage compared to natural gas;
- Regulations related to energy efficiency and the use of renewable energy sources in buildings used for the design of new and renovation of existing buildings favor individual heating systems with unfavorable primary energy factors that put even high-efficiency cogeneration in an uncompetitive position compared to individual gas boilers (proposed primary energy factors are in the case of all district heating systems worse than all other forms of heating including coal and fuel oil;
- There are no mechanisms to encourage the use of district heating systems at local, regional or national level in terms of encouraging investment;
- Adequate mechanisms for technical assistance and encouragement of investments in district heating systems are lacking, except for the reconstruction of existing distribution network routes;
- Investments in individual gas condensing boilers continue to be encouraged, while some countries, such as the Netherlands, are banning the installation of new fossil fuel boilers.

The above obstacles significantly hinder investments in the modernization of district heating systems and thus hinder their development. It is necessary to eliminate them at all levels and integrate positive changes into the legislative framework and planning processes at the local, regional and national levels.

A key and necessary step in the timely decarbonization of urban areas in the Republic of Croatia is the modernization and expansion of existing and the development of new centralized heating and cooling systems. These systems are extremely important as they enable the efficient supply of large amounts of energy, without taking up valuable space, from renewable sources such as solar and geothermal energy and waste energy from industrial and energy processes. Such systems also enable rapid adaptation of production systems and thus monitoring of technological development without burden on the part of end users. This opens the possibility of wide application of local resources and knowledge and creates added value in the form of local economic growth and job creation. Investments in energy efficiency and renewable and highly efficient energy sources, by objectifying the price of thermal energy for all categories of customers and withdrawing funds from EU funds, we can establish efficient and sustainable heating systems in cities and other densely populated areas, with minimal energy and water losses. In addition, it is necessary to implement and modernize the existing systems of remote vision and monitoring of production and distribution of thermal energy in order to further optimize the work.

In order to encourage the modernization and further development of district heating and cooling systems, the following is necessary:

- Amendments to legal provisions that place district heating and cooling systems in an unfairly bad position vis-à-vis individual systems and / or do not encourage the use of efficient and renewable energy sources (for example in the case of primary energy factors);
- Strengthening cooperation between district heating system operators and local and regional self-government units;
- Initiation of technical assistance programs for the development of projects for the modernization of central heating systems and the development of central cooling systems;
- Launching a program of co-financing investments in the modernization of distribution and production capacities of district heating systems through the Structural Funds, the Modernization Fund, the Recovery and Resistance Plan and so on;
- Implementation of the process of integrated energy and climate planning in local and regional self-government units and definition of low-carbon and carbon-free zones of the city following the example of advanced European cities such as Vienna;
- Defining gasification and hot water zones in urban plans of cities;
- Initiating the development of a central cooling system.

Centralized heating and cooling systems are a key tool in the process of decarbonisation of the Republic of Croatia and are recognized as such in key strategic documents, but from a practical and operational point of view, Croatian legislation has a disincentive effect on them. These guidelines provide a number of recommendations that the Council proposes to incorporate into the legislation of the Republic of Croatia, which is currently in the process of harmonization with European directives - the Heat Market Act, the Renewable Energy Sources and High Efficiency Cogeneration Act, the Ordinance on Allocation and Costing. For delivered heat, ordinance on the

system for monitoring, measuring and verifying energy savings and technical regulation on rational use of energy and thermal protection in buildings - to encourage the modernization of existing and development of new district heating and cooling systems.

This can be seen as a good result which was maintained throughout the ENTRAIN project so far and will help for the implementation of QM Holzheizwerke in long term.

Cities, regions and municipalities play a vital role in driving the transition to clean energy. Local and regional governments are usually the ones that need to implement national and European legislation into practice. However, implementation is often hindered by the lack of mechanisms to enact and enforce binding energy and climate framework on a local or regional level, the lack of alignment of strategies, plans, and policies, and the lack of a systemic, integrated, and consistent approach to energy and climate planning. Although local and regional governments are faced with often limited means of tailoring their energy and climate policies, there is a system in place to define their development pathways, namely the spatial and zoning plans. Traditionally used to define land use as well as set restrictions for land development, today spatial plans offer an opportunity for prioritising energy efficiency and renewable energy sources, reducing greenhouse gas emissions and improving air quality and quality of life of citizens.

In Croatia, General Urban Plans (GUP) represent key spatial planning documents at the local level created through the interdisciplinary activity of spatial or urban planning. GUP directly defines the requirements, conditions, obligations and opportunities related to the development of business activities, energy and transport infrastructure and their location in urban space and conditions for urban transformation and rehabilitation. With its obligatory nature, GUPs enable a very clear and direct impact on the development of cities and municipalities and can empower cities in adopting and implementing development strategies in the field of climate and energy. By clearly defining areas in which the implementation and integration of climate and energy projects are envisaged and prohibiting individual solutions based on fossil fuels, local governments can positively affect their energy and climate ambitions and shape the energy transition in their communities. The City of Karlovac our pilot in project ENTRAIN is in the process of modifying its spatial and zoning plans. In order to utilize this opportunity to define the cities development pathway into a sustainable future, the North-West Croatia Regional Energy Agency is supporting the city to transform the process and deliver a Green spatial and zoning plan, the first one of its kind in Croatia. The City of Karlovac has recently completed its Sustainable Energy and Climate Action Plan and is now in the process of modifying its spatial and zoning plans. The City has recognized the potential synergy between the two actions and is, with the support from the North-West Croatia Regional Energy Agency, integrating them into the first Green spatial and zoning plan in Croatia. The overall concept is to empower and enable local and regional governments to explicitly set and bindingly enforce their development pathways with a focus on sustainable development and environmental protection, using tools already at their disposal. Within the project, a set of guidelines for the integration of energy and climate measures into the cities spatial and zoning plans will be developed, backed by a set of assessments and analysis, and subsequently implemented. The final result of the action will be a Green spatial and zoning plan which will define and mandate the implementation of climate change mitigation and adaptation measures within the city limits. This will include measures which will go beyond the state of the art. These measures will include the definition of low carbon or carbon free zones, limitation on the expansion of the use of fossil fuels for heating, mandate the implementation of building scale renewable energy production or use of green infrastructure and so on.

All stakeholders from target regions in Croatia so far agreed, that the activities of the ENTRAIN project can be seen as a good example for an appropriate planning and promotion of sustainable energy and heating systems on local level. However, the lack of data and often the limited financial and technical capacities, prevent local governments from designing robust energy efficiency and climate plans and integrating energy efficiency and renewable energy solutions into spatial and development planning. Croatian target counties in cooperation with REGEA will continue to meet with local, regional and national authorities, in order to provide them information on successful experiences and jointly identify innovative solutions for the implementation QM Holzheizwerke at local and regional level in Croatia.

1. STRESZCZENIE W JĘZYKU ANGIELSKIM (SUMMARY IN ENGLISH)

Quality management is about overseeing all the activities and tasks that must be performed to maintain the desired level of excellence. It includes defining quality policy, creating and implementing quality planning and assurance, as well as quality control and improvement. It focuses on long-term goals by implementing short-term initiatives.

Quality management systems formalise and enable the implementation of quality management principles. They make it possible to document the processes, procedures and responsibilities for implementing the quality policy and objectives. They also help to coordinate and direct the organisation's activities to meet customer and regulatory requirements and to continuously improve effectiveness and productivity.

There are various quality management systems. The most popular and widely used in industry is the system proposed in the PN-EN ISO 9001:2015 standard. This standard specifies the requirements that an organisation's quality management system should meet. Organisations use this standard to demonstrate their ability to consistently deliver products and services that meet customer and regulatory requirements. ISO 9001:2015 can be applied to any organisation, regardless of size or industry. More than one million organisations in over 160 countries have applied the requirements of ISO 9001 to their quality management systems.

ISO 9001 is based on a plan-do-check-act (improve) methodology and provides a process approach to documenting and reviewing the structure, responsibilities and procedures required to achieve effective quality management within an organisation or business, regardless of its size or industry.

Another quality management system dedicated specifically to biomass heating systems is the **QM HOLZHEIZWERKE** system for quality management in biomass heating plants producing heat for heating and domestic hot water supply. The QM system is the result of international cooperation. It was developed by a working group on quality management in biomass heating plants with experts from Switzerland, Austria, Germany and recently also Italy, who are constantly developing and improving it. It aims to achieve the following basic quality objectives, which include:

- reliable, low-maintenance work
- precisely and stably operating control and monitoring systems
- possibly high utilisation rate and low distribution losses
- low emissions in all modes of operation
- sustainability of environmental and economic objectives

The QM system enables the professional design, planning and construction of district heating plants and networks, specifying the quality requirements to be met and ensuring that these requirements are constantly monitored, from the start of the project to the final inspection after the first year of operation of the district heating system.

One of the key tasks in the ENTRAIN project was to translate the system documentation into Polish, adapt it to Polish conditions and support the dissemination and implementation of the system in Polish district heating plants.

The ENTRAIN project developed a plan to adapt the HOLZHEIZWERKE QM system to Polish conditions, to disseminate it, to encourage Polish investors to use it when planning new/developing existing district heating networks using RES (including primarily biomass) and to train quality management specialists who could support the implementation of the system from a neutral investor position. Members of the Regional Advisory Team established under the ENTRAIN project were involved in adapting the system to Polish conditions, and the entity responsible for its implementation in Poland, training, accreditation of energy management specialists and supervision of pilot implementations is the Association of Municipalities Polish Network "Energie Cités". The aim of implementing the system is to improve the design and operation of district heating systems using biomass fuels, reducing dependence on fossil fuels from politically unstable regions, and reducing greenhouse gas and other pollutant emissions into the atmosphere.

In order to adapt and disseminate the use of the HOLZHEIZWERKE QM system, the following measures have been planned:

- Action 1: Translation and adaptation to national conditions of the energy management system documentation for biomass heating plants
- Action 2: Consultation of the adapted biomass district heating energy management system documentation with the members of the Regional Advisory Team and its further adaptation
- Action 3: Extensive promotion of the HOLZHEIZWERKE QM system using PNEC communication channels (traditional and social media, networking, events) and members of the Regional Advisory Team (traditional and social media, networking, events).
- Activity 4: Organisation of a training course on the implementation of QM HOLZHEIZWERKE in biomass-fired district heating plants.
- Action 5: Creation of a one-stop-shop QM HOLZHEIZWERKE.

A dedicated tab will be set up on the PNEC website with a detailed description of the system, all its components/documents, as well as guidelines on how to implement the system in your planned district heating plant, what quality requirements need to be met and which stakeholders to involve. If necessary, the Association - as the system promoter in Poland - will organise dedicated training and support the implementation of QM HOLZHEIZWERKE in interested district heating plants.

- Action 6: Accreditation of quality management specialists for biomass heating plants

The Association of Municipalities Polish Network "Energie Cités", as the national partner of the project responsible for the adaptation of the system to the national conditions, will be responsible for its proper implementation as well as for the accreditation of quality management specialists, who will be responsible for the implementation of the system within selected projects. The list of these professionals and their contact details will be published on the project website (http://www.pnec.org.pl/pl/entrain/).

1. EXECUTIVE SUMMARY

We started the extension of the QM system to the territory of Slovenia through two channels. First, through the Institute of District Energy (IDE) and the Cluster of District Energy of Slovenia (GDES), where we target larger district heating systems. And second, through the Local Energy Agency for Primorska Notranjska and Goriška (GOLEA), where smaller DH systems in the territory where smaller DH systems are most common.

There are rules for planning DHS on the national level and the Slovene energy agency takes care of the regulatory framework. The Chamber of Engineers of Slovenia issued some recommendations in sectoral planning such as hydraulic and mechanical.

However, both IDEs and GDESs have great potential in managing larger biomass DO systems. The tools and materials developed in the Entrain project will continue to be promoted among potential users and the goal in the future is to make QM a uniform and protected brand for quality in Slovenia as well.

Even smaller systems are already, at least partly, using QM recommendations. GOLEA has made great strides towards visibility, and we look forward to some progress in the future. They directly influenced on eight (8) smaller DH systems.

In the introduction of QM standards, we noticed the insensitivity of existing operators and established methods of work. We expect that the situation in the future, with rising energy prices, increasing public awareness of air pollution, etc. will encourage the use of QM standards, especially in the proper use of biomass, connection to local suppliers and new flue gas cleaning technologies.

Within the Entrain project, we have taken a step in the right direction to introduce the QM standards in Slovenia unfortunatly institutionalization of this mechanism is still a long way off. Much action will still be needed to ensure that such standards will be adopted among district heating system operators, while there are many acts in the legislative and regulatory field that operators must comply with. In the future, it would certainly be worth considering reducing administrative burdens and procurement requirements for DH system operators and thus the introduction of standards such as QM Heizwerke would also receive greater support.