

Research and Development



**Questionnaire for the event series:
"Digitalisation in district heating?
Software & Tools for District
Heating Applications "**

Table of contents

1. Classification of the field of application of your product/tool.....	- 6 -
2. Requirements.....	- 8 -
3. Data in general.....	- 18 -
4. Communication.....	- 22 -
5. Transformation.....	- 23 -
6. Barriers.....	- 23 -
7. Benefit.....	- 24 -
8. Application of your tool.	- 26 -
9. SafetyandSecurityt.....	- 27 -
10. Your wishes.....	- 28 -
11. Your contact persons at AGFW.....	- 29 -

General information about the event

Objectives of the event series

Regardless of whether you are already selling a commercial product, would like to adapt an established product to the German market, are looking for partners for demo projects or are looking for an experienced practical partner from the district heating industry for the final development steps, in the course of the event series "Digitalisation in District Heating? - Software & Tools for District Heating Applications", **you will have the opportunity to present the added value of your product and address your wishes to the industry.**

With the event series "Digitalisation in district heating? - Software & Tools for District Heating Applications", the AGFW R&D department would like to offer innovative companies the opportunity to present themselves and their products to the district heating industry. The activities in the course of the virtual jubilee year "50 years AGFW", which are especially tailored to AGFW member companies (more than 270 district heating supply companies and further 230 companies from the district heating industry), are the kick-off for this.

The aim of the online offer is to reach different representatives of specific departments of a company, which is made possible by the short time required for participants. In this way, they can directly form an opinion as to whether and how a presented tool is helpful in their own company, and queries and discussions can be conducted very quickly on a professional level.

Registration

To register for a presentation in this series, we would like to ask you to **fill out the following questionnaire**, which will be used as a basis to advertise the individual presentation dates and to give the participants a rough overview of the expected topics. Furthermore, additional information is requested that will allow AGFW to get a detailed overview in the field of DH software tools and technologies, with the aim to incorporate this input into ongoing and future research projects (to identify contact persons and possible research partners) and to support member companies in finding concrete solutions to problems.

After we receive the completed questionnaire, you will receive the access data to sign up for an event date, the number of possible sessions will be adjusted according to the demand. As soon as a session is filled with speakers, you will receive the confirmation, then the event will be published and can be advertised.

(optional) Each speaker is free to provide 5 slides in PDF format (3x content + 1x cover sheet and 1x conclusion with contact details and further links) in advance, which will be available on our website (www.agfw.de/digitalisierung) as a first information.

The event format

The events are conducted purely online and are limited to 60 min. After a short introduction by AGFW, each of the maximum of three speakers has 10 minutes to present themselves

and their product in the best possible way. The participants have the possibility to send their questions via chat to the moderator at any time, who then collects and processes the questions. The moderator will then ask the questions afterwards or during a final discussion round (up to 30 min) in which all presenters can have their say again.

The **presentation slides** (as PDF), including the contact information you provide, are to be sent to AGFW **one week before the presentation**. This way they can be accessed at short notice (e.g. in case of technical problems of the web tool).

Follow-up

For the follow-up for the participants and for the use of the greatest possible reach, it is planned to publish the presentation slides, as well as video recording of the presentation via the channels of the AGFW (public and internal member area, AGFW websites, project websites, social media channels, etc.).

Contact details (public¹)

Name:

Job Title:

Company Name:

Name of your Tools for the digitisation of DH:

Contact details:

Phone:

Mail:

Website:

Social Media:

If different: contact details for further communication with AGFW
(data will not be published):

Business Positioning Statement (public¹)

The BPS provides space for a brief description of your product/service and its target market. You can use the space to outline, for example, how the product or service meets a specific need of the target market. You are also welcome to use the space to introduce your vision or goals.

Your response to focus on the core message and serve as a small brief description of what you offer (including your company, if applicable) and may be published through the AGFW channels (even before your presentation for solicitation, if applicable).

You have the opportunity to provide more detailed information at the end of the questionnaire.

(Limit 750 characters)

¹ This information will be used by AGFW for publication as needed, for example, to draw attention to relevant event; or to inform about Available Tools in the DH sector; also to filter by keywords, if applicable.

The Questionnaire

1. Classification of the field of application of your product/tool (public¹)

Status of the Tools: []-----[]-----[]-----[]

R&D

Prototype

market-ready

commercial Tool

Which "buzzwords" would you classify your tool under?

- AI
- Big Data
- Blockchain
- Cloud Computing
- Deep Learning
- Virtual Reality
- Augmented Reality
- Digital Twin
- Other:

Which category does your tool belong to:

- Standalone Hardware
- Retrofit Hardware
- Software
- Other:

Is your tool already in use in other (energy) divisions and was it inspired by this or by the personal background of the staff in your company?

- No
- Yes, from the electricity sector
- Yes, from the gas sector
- Yes, other:

Bitte wählen Sie in der nachfolgenden Liste die (Teil-) Bereiche, in denen Ihr Tool zur **Anwendung (A)** kommt und welche (Teil-) Bereiche es hauptsächlich **beeinflussen (B)** soll:

A	B	Main section at the DH system	A	B	Sub section at the DH - System
		1) Generation			
					Generation Optimisation
					Integration of Renewable Energy Sources (RES)
					Decentralised Generation
					Maintenance and repair
					Others: _____
		2) Distribution			
					Grid/ Network operation
					Planning & Design
					Lifetime
					Maintenance and repair
					Others: _____
		3) Demand/ Consumption			
					Consumer
					Building
					User
					Maintenance and repair
					Others: _____
		4) Total DH system			
					Sector coupling
					Power serviceability
					Maintenance and repair
					Others: _____
		5) "Supporting" processes			
					Asset management
					Management
					Accounting
					Others: _____
		6) Others:			
		_____			_____
		_____			_____
		_____			_____
		_____			_____
		_____			_____

Additions/comments to the preceding section:

2. Requirements²

In the following chapters 1-6, please edit the areas in which your tool is used (A) or which your tool influences (B), according to your specifications in the previous table.

What are the minimum basic (technical) requirements that must be met for the use of your tool to be possible?

² The information in this chapter serves to provide an overview of requirements, prerequisites and opportunities and is intended to form the basis for current and future (research) activities of the AGFW. Corresponding evaluations will be published in aggregated form at most. If there is a need to explicitly combine the information given here with a tool/company, this will only be done with the involvement and approval of the company concerned.

2.1. Generation

Erzeugungsanlagen	
Plant type	What requirements must be met for your tool to be used? <i>For example, only/not or best suited:</i> » for certain types of plants (CHP, geothermal, P2H,...); » for plants with a generation capacity of min/max; » when several types of plants are available; » when different primary energy sources are available; » when heat, cold and electricity can be generated.
Degree of Digitalisation	What "degree of digitisation" of the generation plants must be present for the use of your tool? <i>For example, the necessary/preferred/expected level of digitisation (in terms of equipment sensors, control, interfaces, communication capability, etc.):</i> » usually sufficient for plants currently in operation; » easily sufficient for plants not older than; » to be achieved by simple retrofitting measures; » usually to be achieved by comprehensive adaptations.

Interconnection/ Access	What data does your tool need access to at least/ideally? For example: » Access to power plant control system data; » Direct access to data on total generation; » Access to monitoring of grid feed-in (pressure, temp., volume flow); » Access to operating data of network pumps; » Access to pumping stations in the network; » Access to data of network monitoring; » Access to data of substations (at a rate of%).
Result	How can/will the result of your tool be provided/used? For example: The output from the tool is used » for direct control intervention (in generation, grid injection, etc.); » as a proposal for manual adjustments of power plant dispatch; » as a proposal for medium/long term control strategy of power plant deployment, maintenance, asset management, etc.

Additions/comments to the preceding section:

2.2. Distribution

Distribution Network	
Grid type/ character	What requirements must be met for your tool to be used? <i>For example, only/not or best suited:</i> » for certain pipeline types (plastic jacket pipe,, hooded channels,,...); » leak monitoring systems (e.g. warning wire system) are present throughout; » for hot water-, low temperature-, cold-, steam- networks; » if there is a complex (e.g. by meshes) routing; » when subnetworks/intermediate stations are present; » when generators feed into the grid from multiple locations (distributed generation); » "prosumers" are integrated in the grid; » Predominantly/exclusively (in-)directly connected consumers are on the grid; » The operating temperatures in the supply/ return are in the range of min./max./ Ø °C.
Digitalisation	What level of "digitisation" on the network is required to use your tool? <i>For example: Is the necessary/preferred/expected level of digitisation (in terms of equipment sensors, control, interfaces, communication capability, etc.):</i> » easily sufficient with today's FW networks; » possible by simple retrofitting (e.g. in manholes, without drilling); » only sufficient if at least for a rough mapping of the current actual state in the network is possible; » only sufficient if a detailed mapping of the current network status (digital twin) is possible.

Interconnection/ Access	What data does your tool need access to at least/ideally? <i>For example:</i> » Access to power plant control system data; » Access to forecast data; » Access to monitoring of the grid feed-in (pressure, temp., volume flow); » Access to operating data of the network pumps; » Access to pumping stations in the network; » Access to data of network monitoring; » Access to data of substations (at a rate of%).
Results	How can/will the result of your tool be provided/used? <i>For example: The tools output is used:</i> » for direct control intervention (in generation, grid injection, customer plants, etc.); » as a proposal for manual adjustments of grid operation; » as a proposal for medium/long-term strategies for maintenance, maintenance asset management, etc....

Additions/comments to the preceding section:

2.3. Heat demand/ heat consumption

Heat demand/ heat consumption	
Substations	Which requirements must be met for your tool to be used? <i>For example, only/not or best suited:</i> » for specific heat transfer stations/ substations - (directly, indirectly connected, ...); » for substations for hot water, low temperature, cooling, steam systems; » if different price levels for heat are possible; » if space heating, cooling and/or domestic hot water heating is controlled by the substation; » when alternatives for reheating and/or storage are available; » if several end users use a common type of substation; » if data from the individual home stations are also available; » if a (price) signal can be transmitted for the customer side; » if a control intervention in the customer installations is possible; » in case the user enables a connection to his smart home system.
Digitalisation	What level of "digitisation" of the substation must be present to use your tool? <i>For example: Is the necessary/preferred/expected level of digitisation (in terms of equipment sensors, controls, interfaces, communication capability, etc.):</i> » largely sufficient with the substation currently in operation; » be fulfilled as far as possible with remotely readable heatmeter. » sufficient without problems for systems commissioned after _____; » can be brought up to a sufficient level by simple retrofitting; » usually be comprehensively expanded.

Interconnection/ Access	What data does your tool need access to at least/ideally? <i>For example:</i> » <i>Data from the power plant control system (near real-time, if necessary);</i> » <i>Direct access to data total generation;</i> » <i>Access to monitoring of grid feed-in (pressure, temp., volume flow);</i> » <i>Access to operating data (network pumps, pumping stations, etc.);</i> » <i>Access to dsubstations (at a rate of%).</i>
Results	How can/will the result of your tool be provided/used? <i>For example: The output from the tool serves:</i> » <i>the direct control intervention on the customer side;</i> » <i>the transmission of a (price) signal to the customer;</i> » <i>optimisation on the supplier side without influencing the customer;</i> » <i>suggest customer-side measures and report the resulting potential to the supplier.</i>

Additions/comments to the preceding section:

2.4. Overall system

Overall system	
Type of system	What requirements must be met for your tool to be used? <i>For example, only/not or best suited:</i> » for certain DH systems; » if certain structures are present; » if certain elements/business models are present in the overall system; » for (cross) integrated companies.
Digitalisation	What level of "digitisation" in the overall system must be present to use your tool? <i>For example: Is the necessary/preferred/expected level of digitisation (related to equipment sensors, control, interfaces, communication capability, etc.):</i> » largely sufficient with today's DH systems; » to be met in the next few years anyway (due to technical, legal developments); » to be retrofitted by measures with justifiable effort; » to be achieved with considerable additions and comprehensive.

Interconnection/ Access	What data does your tool need access to at least/ideally? For example: » Access to power plant control system data; » Direct access to data on total generation; » Access to monitoring of grid feed-in (pressure, temp., volume flow); » Access to operating data of network pumps; » Access to pumping stations in the network; » Access to data of network monitoring; » A number of substations (at a rate of%).
Results	How can/will the result of your tool be provided/used? For example: The output from the tool serves » for direct control intervention in specific areas; » to suggest short-term adjustments; » as a proposal for medium/long-term adjustments in the overall system; » for different optimisation proposals in the operation.

Additions/comments to the preceding section:

2.5. Supporting process/ others

Begleitprozesse / Sonstiges	
Proses/ Subsection	What requirements must be met for your tool to be used?
Digitalisation	What "level of digitisation" must be present where for the use of your tool?
Interconnection/ Access	What data does your tool need access to at least/ideally?
Results	How can/will the result of your tool be provided/used?

Additions/comments to the preceding section

3. Data in general²

Even if it is technically possible in principle to generate almost unlimited amounts of data and also to process them to a certain extent, there are sometimes technical, organisational or economic limits to the procedure in reality. Influenced by the real expected change rates of the measured variables, the measuring frequency of the sensors, the maximum amount of data that can be safely transmitted by the communication technology, the server performance, but also by the number of relevant measuring points in the overall system, a range can be identified in which the best possible benefit can be achieved with a justifiable effort.

In the following chapters 3.1-3.3, please edit the areas in which your tool is used (A) or which your tool influences (B), according to your specifications in the table of chapter 1.

If your tool is intended for the overall system or accompanying processes, you are welcome to briefly outline the data requirements in Chapter 3.4 and use or refer to Chapters 3.1-3.3 as a template.

For companion processes and others, please also use the free text in chapter 3.4.

What are the minimum basic (technical) requirements that must be met to enable the use of your tool?

For the application of your tool you therefore generally recommend:

- » A Ø measurement value acquisition at a distance of two measurements of
[] ____s [] ____min [] ____h [] ____d
- » A data transmission
[] at the same interval [] deviating at an interval of

3.1. Generation

Erzeugung	
	For the use of the tool, the measured values are sufficient which are required and available anyway for the proper operation (not assuming manual operation) of the generating plants.
	In addition to the generation plants, further data of the entire power plant site are necessary for the use of the tool, which are required and available for proper operation anyway.
	For the use of the tool a connection to the complete power plant control system is necessary.
	In addition, the acquisition of the following measured values is necessary:

Additions/comments to the preceding section:

3.2. Distribution grid

Distribution grid	
In addition to the temperature at the flow and return, the following measured values should also be recorded	☐ Pressure ☐ Volume flow
	It is sufficient to know the data at the network feed points.
	In addition to the network feed in points, the data of any pumping stations in the network should also be known.
	For the use of the tool, the network critical points (lowest pressure difference) should be known and monitored, so that these data are available as input.
	For the use of the tool, the measurement data should be collected at all network ends.
For the use of the tool, a maximum distance should not be exceeded between two measuring points in the network:	☐ Max. every km trace ☐ ideally all km trace
	For the use of the tool, the measurement data should be collected at all substations (primary side).

Additions/comments to the preceding section

3.3. Heat demand/ heat consumption

Wärmeabnahme	
In addition to the heat meter data (prim. temperature at flow and return, flow rate), the following measured values should also be recorded:	☐ pressure ☐ everything also on the secondary side
Minimally, the data of the following substations should be collected for a use of the tool:	☐ ____ % of all substations ☐ the biggest substations with around ____ % of total connected load of the grid ☐ every ____-st/-nd/-rd/-th substation ☐ all substations at: ☐ strand ends ☐ next to a known grid weak point ☐ _____ ☐ _____ ☐ _____
Ideally, for best use of the tool, data from the following substations should be collected:	☐ ____ % of all substations ☐ the biggest substations with around ____ % of total connected load of the grid ☐ every ____-st/-nd/-rd/-th substation ☐ all substations at: ☐ strand ends ☐ next to a known grid weak point ☐ _____ ☐ _____ ☐ _____

Additions/comments to the preceding section:

3.4. Overall system/ Supporting processes/ Others

If your tool is intended for the overall system, accompanying processes, or other, you are welcome to briefly outline the data requirements in this chapter and, if necessary, use the contents of the preceding chapters 3.1-3.3 as a guide.

4. Communication²

Which communication standard (MQTT, MTConnect, OPC Classis, OPC-UA, ...)³ and which transmission paths do you recommend for the use of your tool?

Which criteria (scalability, conformance, etc.)³ must a communication standard or transmission path already used in the system meet in order to satisfy the requirements of your tool?

³ <https://www.ingenieur.de/fachmedien/vdi-z/industrie-4-0/welcher-kommunikationsstandard-fuer-kuenftige-industrie-4-0-fabriken/>

5. Transformation²

Even if real systems often do not fulfil all requirements from the beginning, software tools can also help to "improve" certain (partial) areas beforehand. The transformation of an initial system into a system that is as ideal as possible for the application of the tool can, under certain circumstances, only take place in stages and over a longer period of time (for example, due to the available finances or the linking of certain deadlines and measures that are pending anyway). However, with detailed pre-planning, this process may be able to be planned in such a way that significant successes are achieved at an early stage.

Can you outline a rough "transformation process" for the best possible use of your tool?

6. Barriers²

Depending on the resources required, the potential consequences of any necessary changes (organisational, technical, contractual, etc.) and the certainty of the expected effect to be achieved by the deployment, barriers may arise that stand in the way of using/ implementing your tool. Can you briefly outline the most common barriers that stand in the way of using your tool and possible counter-arguments:

7. Benefit²

What is the primary goal/potential of your tool?

How do you think the "problem" you address with your tool has been solved in DH utilities/ systems so far?

- According to our assessment, our tool addresses a problem that has not been solved so far/ helps to uncover a potential that has not been leveraged so far.
- The problem is often solved in a time-consuming manner and our tool achieves comparable/ better results with a significant reduction in effort.
- The problem is solved to the best of our knowledge, the introduction of our tool is expected to lead to a significant improvement compared to the currently achievable results.
- Others:

What is the USP of your product?

What quantitative measure best describes the expected added value from using your tool?

(For example: Savings CO₂/kWh, €/kWh; Customer satisfaction %; Reduction of necessary processing time h/month; etc.).

Response:

In addition to their clear added value, many software tools also have a positive impact on other stakeholders. Please outline in the table below the added value that may benefit several stakeholders:

Stakeholder	Domain	
DH company		
	Economical	
	Ecological	
	Customer relation	
	Social	
	USP/ Image	
	Others	
Customer (House owner)		
	Economical	
	Ecological	
	Social	
	USP/ Image	
	Others	
End-user		
	Economical	
	Ecological	
	Reduced effort	
	Others	
Thiord party		
	Economical	
	Ecological	
	Others	

Comments on the previous table?

Are there any practical examples/use cases (in Germany) that you could use to demonstrate your tool? (Gladly with references to further information)

8. Application of your tool²

What business model do you offer for the use of your tool:

- Participation in the savings achieved
- Software as a Service
- Platform as a Service
- Subscription to use the software
- Purchase of the software
- Others:

Is a comprehensive employee qualification (new task areas) necessary to achieve the added value of your tool?

- No we offer the complete package and need only for the initial setup the close coordination with the experts to adapt the individual wishes and boundary conditions.
 - o However, the company can take over decisive work steps itself if the team is trained accordingly.
 - o _____
- No, but training for the correct use of the software is offered and recommended.
-
- Yes, the following experts (IT specialist, programmer, etc.) are required on the company side for smooth use:
 - o _____
 - o _____
 - o _____
 - o _____
 - o _____

What is the process for necessary changes and adjustments to the program in your tool?

- Only possible by us as the software producer
- After appropriate training, possible by the employees Admin of the company.
Applies to:
 - o Admin activities such as user management, etc.
 - o Regularly occurring changes to the DH system Adapt (e.g. new customer, new network strand)
 - o Major changes to the DH system (e.g. new generation plant, new neighbourhood)
 - o Patching the tool
 - o Adaptation of the tool to a new software environment
- Potentially possible by software experts/programmers with extensive expertise in the areas of:
 - o _____
 - o _____
 - o _____

9. Safety and Security²

Where are the servers running your software tool and where the collected data is stored?

- USA
- EU
- Germany
- Our own servers in _____
- The server structure can be set up on the customer's premises, if required.
- No central server architecture is necessary for our tool
-

Safety and security is a crucial aspect when using software tools in the field of energy supply. Not only compliance with legal requirements in handling any personal data must be ensured, but also aspects such as fail-safety of the overall system, black start capability, user errors, protection against data loss, etc. must be adequately checked.

Even if DH systems in Germany themselves are rarely classified as critical infrastructure, the highest security requirements apply to many interconnected companies (if not legally, possibly also internally). Please list which security standards/certificates your software meets or in which environment it can be used (ISO 27001, BSI-KritisV, ISO 9001, etc.) or which structural measures you take (e.g. closed system, no control authority, etc.).

10. Your Wishes

Please indicate whether your wishes may be published or are only to be used for aggregated evaluation

- Released for publication with naming of the company
- Please use at most for evaluation in aggregated form

What would best help you and your company or what is missing to further roll out/broadcast the benefits of your tool?

- Start-up capital
- Practical examples/ demo projects
- General company contacts to DH utilities
- Joint R&D activities for customized industry solutions
- More detailed DH specific specifications/ standards.

Others:

11. Your contact persons at AGFW



Contact person Technical / Registration and feedback questionnaire

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