Hamburg ahead

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Wilhelmsburg Central Integrated Energy Network

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Contents

A.	INTRODUCTION	4
A.1.	Key theme: Cities in Climate Change	4
A.2.	Project outline	6
A.3.	Wilhelmsburg Central project area	6
B.	PROJECT DETAILS	8
B.1.	Energy concept	8
B.2.	Energy centre	10
B.3.	District heating network	11
B.4.	Energy feed-in users	12
B.4.1.	BIQ	12
B.4.2.	Smart is Green	13
B.4.3.	Water Houses	14
B.5.	Connected consumers	14
B.6.	Project development	16
B.7.	Extensibility and optimisation	17
C.	CONCLUSION	18
	Picture credits	20

A. INTRODUCTION

The idea of the "Wilhelmsburg Central Integrated Energy Network", realised as part of the International Building Exhibition (IBA) in Hamburg is to combine many "mini power stations" in various residential and office buildings to form a "virtual" power station by means of a central energy and district heating network.

Integrating Very Diverse Consumers

Integrating consumers with very different peak load times and energy requirements makes it possible to achieve considerable synergy effects, which are far greater than the opportunities for energy optimisation in individual buildings. In this way, the renewable forms of energy used can become a more economical and reliable element within the urban energy supply, resulting in reductions in costs and CO2 emissions. This pilot project has been implemented in Wilhelmsburg Central, a newly developed model district in the south of Hamburg with various types of buildings and energy consumers.

Contribution to Climate Protection on Wilhelmsburg

All the newly constructed buildings are connected to the system by a heating network: they can take energy from it or feed in renewable heating that they have produced themselves. The opportunities offered by the exchange of heating energy have made it possible, for example, to determine the optimum dimensions for solar thermal power plants and increase their share of the energy mix. Through its careful use of resources and the exploitation of local renewable energy, the "Integrated Energy Network" makes a considerable contribution to climate protection on Wilhelmsburg.

The intention of this White Paper is to document the project from the professional viewpoint and to collect and evaluate important information on the course of the project as a whole (status: April 2014). Further and more detailed information on the project can be obtained from the IBA Hamburg GmbH or from the companies participating.

A.1. Key Theme: Cities in Climate Change

As part of one of its three key themes, under the heading "Cities in Climate Change", the IBA Hamburg monitored the ecological renewal of the city between 2007 and 2013, thus starting off a closely linked project. The "Renewable Wilhelmsburg" Climate Protection Concept, which has been under development since 2008, has led to an estimate (decentralised) of up to 100 per cent renewable energy in the city.

Aims of the Climate Protection Concept

- Energy-related renovation of buildings
- Energy-efficient new building
- Decentralised heating network based on renewable and local forms of energy (including industrial waste heat)
- Production of renewable energy in the district

The 60-plus IBA energy and building projects carried out since 2013 have enabled us to view the first steps of the transformation. The completion of the "Energy Bunker" and the Hamburg-Georgswerder "Energy Hill", plus the planned introduction of geothermal energy in 2015, have already made it possible to supply 50 per cent of the buildings on the Elbe Islands with electricity and one in seven buildings with heating from renewable

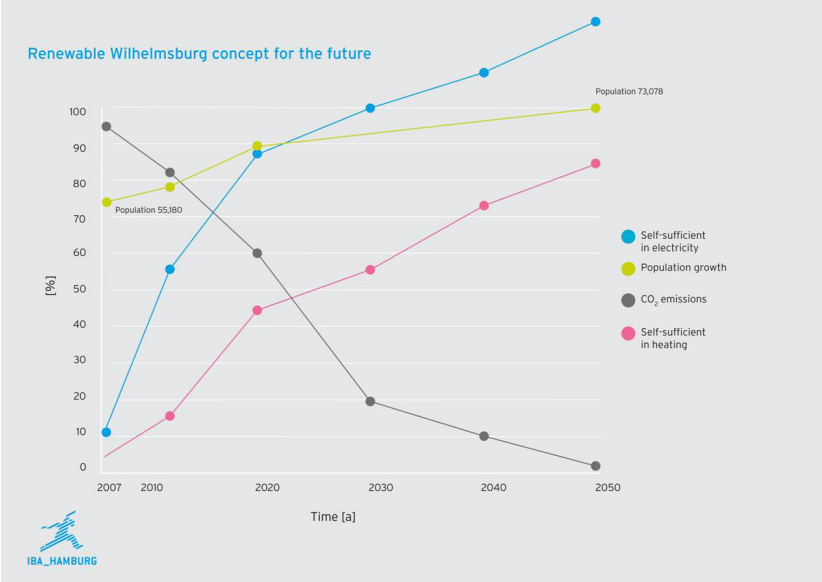

Fig. 1: Target values for the future concept of "Renewable Wilhelmsburg"

energy or cogeneration. By 2030 this should be successfully completed for the supply of electricity to all residential buildings on the Elbe Islands and by 2050 for the supply of heating (see Fig. 1 on p. 5).

In addition, the inhabitants of Wilhelmsburg are to be better integrated – both as partners and by means of financial incentives. To achieve this, an increasing number of combined heat and power plants will come into service, local and regional integrated energy networks will be introduced and storage potential and "virtual" power stations will be used. The "Integrated Energy Network" is an already functioning example of this.

Monitoring and Knowledge Transfer

Since 2010 a scientific study of the effects of the individual measures has been in progress. In the research project "EnEff:Stadt IBA Hamburg", between now and 2015, in more than forty IBA projects, the energy consumption for the surrounding districts will be analysed by monitoring to various depths. So far we have measured the energy flows and investigated user behaviour. We are also working on the continuation of the project and its transfer to other parts of Hamburg and other cities in Europe. In this way the concepts, experiences and results of the IBA will be made available to both professionals and the wider public. The information will be prepared in various formats: the results of the energy monitoring are displayed on the so-called "Energy Table", a multi-media table in the IBA exhibition on the "IBA DOCK", in order to provide a more precise picture of the extensive research programme. In addition, more detailed information about the overall process will be prepared and current pictures and architectural models will be on show.

Integrated Energy Network as Model Project

In the research project "TRANSFORM – Transformation Agenda for Low Carbon Cities", in which the IBA is participating as a Hamburg partner together with HAMBURG ENERGIE and the Ministry for Urban Development and Environment (BSU), , the "Climate Protection Concept" is one of the model projects being studied (see www.transform.eu), along with the "Integrated Energy Network".

A.2. Project Outline

Project participants	HAMBURG ENERGIE GmbH
Project managers	Ministry for Urban Development and Environment (BSU),
Project partners	HHS Hegger Hegger Schleiff Planer + Architekten AG, Kassel
Energy concept	MegaWATT Ingenieurgesellschaft für Wärme- und Energietechnik mbH, Berlin
Contracting partners (heat consumption)	Sprinkenhof AG, Bäderland GmbH, igs GmbH, other investors of IBA-projects at Wilhelmsburg Mitte
General project data	
Investment costs	€ 3.8 million
Promotion	Hamburg Climate Protection Concept
Project course	2007: Start of project development January 2009: Integrated Energy Network Workshop September 2009: HAMBURG ENERGIE project management June 2010: Start of construction February 2013: Completion of the Integrated Energy Network
Thermal capacity	4 MW
Length of the pipeline network	2,000 m (flexibly extensible)
Connected buildings	20

A.3. Wilhelmsburg Central Project Area

The "Integrated Energy Network" is part of the 30 hectare urban development area Wilhelmsburg Central. Here, in a central position on the Elbe Islands, in an area that has hitherto hardly been utilised and was not well integrated with the rest of the city, a whole new district has been created as part of the International Building Exhibition.

A New District of the City

The various types of building house a mixture of residential, commercial and leisure uses with direct access to the Inselpark, which was previously the site of the 2013 international garden show (igs). This lively, independent quarter is to lay the foundations of a better connection between the city areas of Wilhelmsburg, which were previously strictly separated by rail tracks and expressways. An easier eastward connection between Wilhelmsburg suburban station and the shopping centre has already been created by a new footbridge across the railway tracks. Going westward, since 2013, the 6.5 kilometre long "Loop", a leisure track for cyclists, rollerskaters and pedestrians, has provided a splendid, prizewinning road connection to the Reiherstieg quarter, along which urban infill should follow in the years to come.

"Building Exhibition within the Building Exhibition"

With an overall gross surface area (GFA) of 115,000 square metres, IBA Hamburg's biggest urban building project is an important element of the "Leap across the Elbe" and also one of the most innovative districts

in Europe. In the buildings of the "Building Exhibition within the Building Exhibition" residents and visitors can see how society might live and build in the future. The categories "Smart Price Houses", "Smart Material Houses", "Hybrid Houses" and "Water Houses" each present a number of approaches to high-quality building designs in terms of both energy and aesthetics and in relation to the focal themes of reasonable building costs, innovative building materials, adaptable ground plans and building in waterfront locations.

Lively Mixture in the District

The hub of the district is the area around the main entrance to the Wilhelmsburg Inselpark. Here we have not only created pleasant open spaces with promenades and lakes but also upmarket buildings with very varied uses. As well as the residential buildings, there are sport and leisure facilities, offices and service establishments, all contributing to a lively mixture.

Great Development Potential

The basis for the major building project, backed by individual private and public investors to the tune of € 340 million, is a master plan drawn up by Jo Coenen & Co Architekten, Maastricht, in collaboration with the landscape planners agence ter, Karlsruhe/Paris. The plans follow the special landscape and urban design features of Wilhelmsburg, with built-up areas and promenades linked to the lakes and green spaces. Wilhelmsburg Central will be able to develop beyond the IBA areas constructed up to 2013, but it already shows how the Elbe Islands' distinctive contrasts between city and harbour, calm and noise, green spaces and traffic arteries can be overcome and make a lasting improvement in the lives of the inhabitants.

Fig. 2: Aerial view of Wilhelmsburg Central (from the southeast), 2014 – this is where the Integrated Energy Network runs

B. PROJECT DETAILS

The basic idea behind the project was to integrate the supply of an entire district with the most climate-friendly, economically efficient and locally produced energy, in order to exploit the available synergy effects. The many different types and uses of buildings (including swimming pools, hotels, residential and office buildings and sports halls) result in varied energy concepts and usage characteristics. The peak load times in the network are staggered and temporary fluctuations can be evened out by the renewable production.

B.1. Energy Concept

Among the production equipment installed in the area there are interior ventilation systems with heat recovery (in the graphic below : 01), heat pumps for use in geothermal projects (02), photovoltaic modules for the capture of solar energy (03), cogeneration systems (04) and solar thermal plants for heat production (05). The intelligently managed integration (06) of the various energy producers and customers means that the output to be produced can be considerably reduced, the capacity increased and the input of plants running on renewable energy improved – which is not the case with individual supply to buildings.

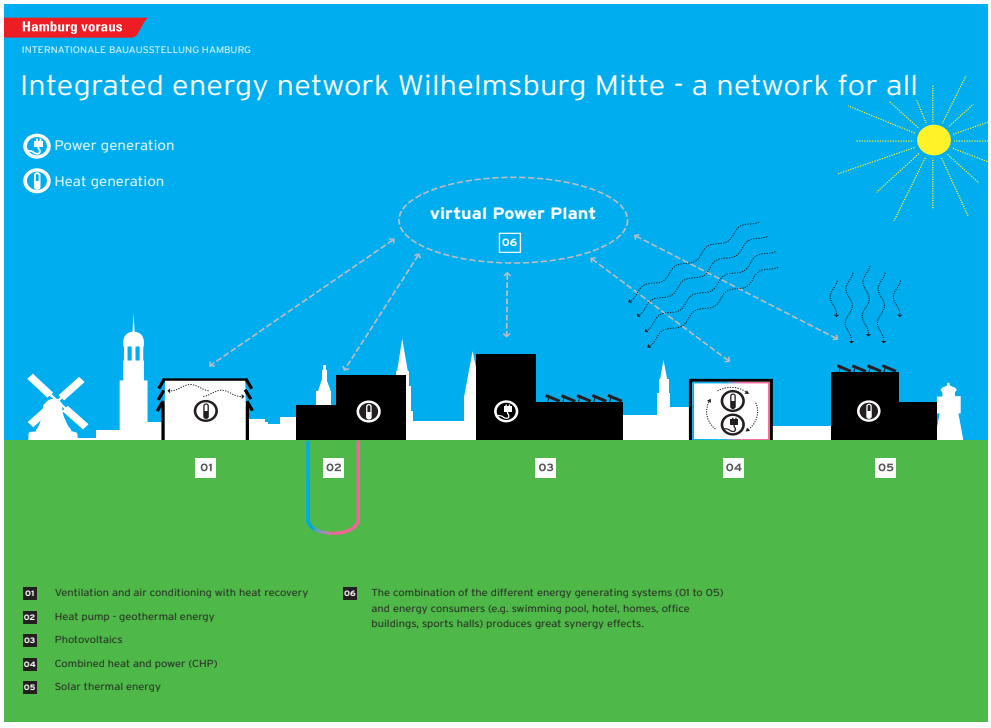

Fig. 3: Functional diagram of the Wilhelmsburg Central Integrated Energy Network"

Fig. 4: A part of the connected new-build area, including "Building Exhibition in the Building Exhibition" (right)

Open Feed-in

In accordance with the legal provisions there is no problem with the renewable power from individual participants being fed in via the public network, distributed and paid for. This kind of liberalisation and regulation of the heating market is expected, so a special integration solution for communal heating supply has been developed. In addition, the IBA Hamburg has implemented a district heating network with the participants, which functions not only as a one-way street from producer to consumer but also as a cross-roads, enabling every participant to take and/or feed in flexible heating energy.

Lower Plant Power

Durch diese Möglichkeit der offenen These opportunities for public feed-in allow the share and efficiency of solar heat and heating from cogeneration, in particular, to be increased in the overall network. The size of solar plants can be operationally optimised and does not have to be determined by the peak demand of consumers in their "own" homes, because excess amounts can be passed on. On the other hand, because of the exchange of available energy, less overall capacity needs to be installed. This saves costs both during installation and later in operation.

"Virtual" Power Station

This "virtual" power station, which consists of plants with a total of 4 megawatts, is managed by an energy centre located right in the area. The heating for the basic load and peak loads is also produced there and circulated through the district heating network to the twenty or so participants connected to the integrated network. The following graphic clarifies this principle and shows all network participants and the amounts of their effect.

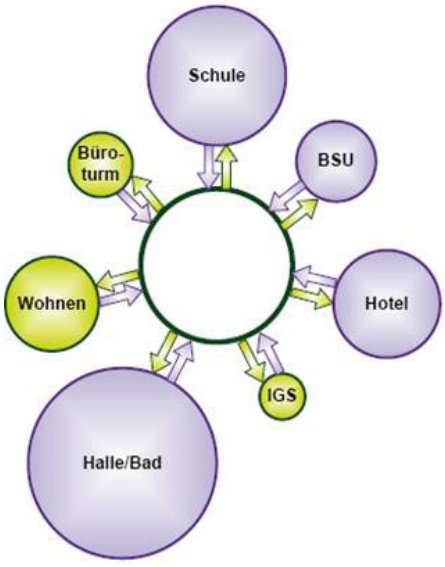

Fig. 5: Simplified diagram of the "virtual" power station (dated 2013, it still includes the international garden show igs)

B.2. Energy Centre

The "Integrated Energy Network" centre, which is around 500 square metres, is located below the forecourt of the Ministry for Urban Development and Environment (BSU). Here a combined heat and power plant with 700 kilowatt thermal and 500 kilowatts electrical power has been set up to take over the basic supply for the heating network. The heat is fed into the district heating system of the "Integrated Energy Network" via heat transfer stations and at the same time the electricity produced is fed into the public network. In order to optimise the operation of the combined heat and power plant, a buffer storage unit with a volume of 20 cubic metres has also been provided.

Processed Biogas - Fossil Natural Gas

The combined heat and power plant runs on biogas, biomethane to be precise, which is produced in the Hamburg sewage treatment plant at the harbour. After suitable processing, this biogas is fed into the city-wide natural gas network, so that the operator in Wilhelmsburg Central simply takes the quantity of biogas purchased from the natural gas network, as shown on the balance sheet. Further, there are two natural gas boilers each producing 1,500 kilowatts of heat installed in the energy centre, which can be switched on at peak load times.

Fig. 6: Peak load boiler

Control by Remote Monitoring

In addition to the production of the basic load for the heating network, the flexible feed-in from the other small production plants in the area is also controlled from the energy centre by complex technology in the plants and by remote monitoring. For example, if a partner in the network is currently feeding in considerable quantities of solar heat, the production of the central heat and power plants is decreased by the same amount.

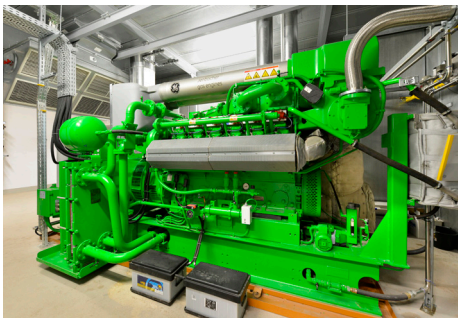

Fig. 7: Cogeneration plant

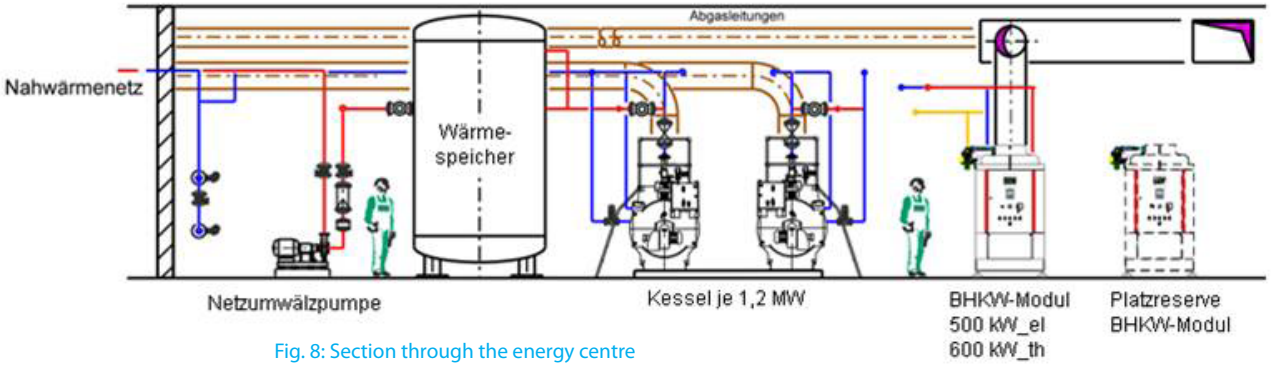

Fig. 8: Section through the energy centre

B.3. District Heating Network

The district heating network that runs from the energy centre is currently 2 kilometres in length. The track, which is laid through the whole area, consists of two parallel pipes for distribution and return. The flow temperature is 70-90°C. The heat is led directly into the buildings, in which, depending on the energy concept, a heat transfer station is installed with or without feed-in option. The network currently connects all the newly constructed buildings of the International Building Exhibition in the Wilhelmsburg Central area (except for the "Soft House"). Depending on how you count them, there are 16 different projects with up to 23 separate buildings or parts of buildings. In any case, the "Integrated Energy Network" was laid out from the start with optional extension in mind.

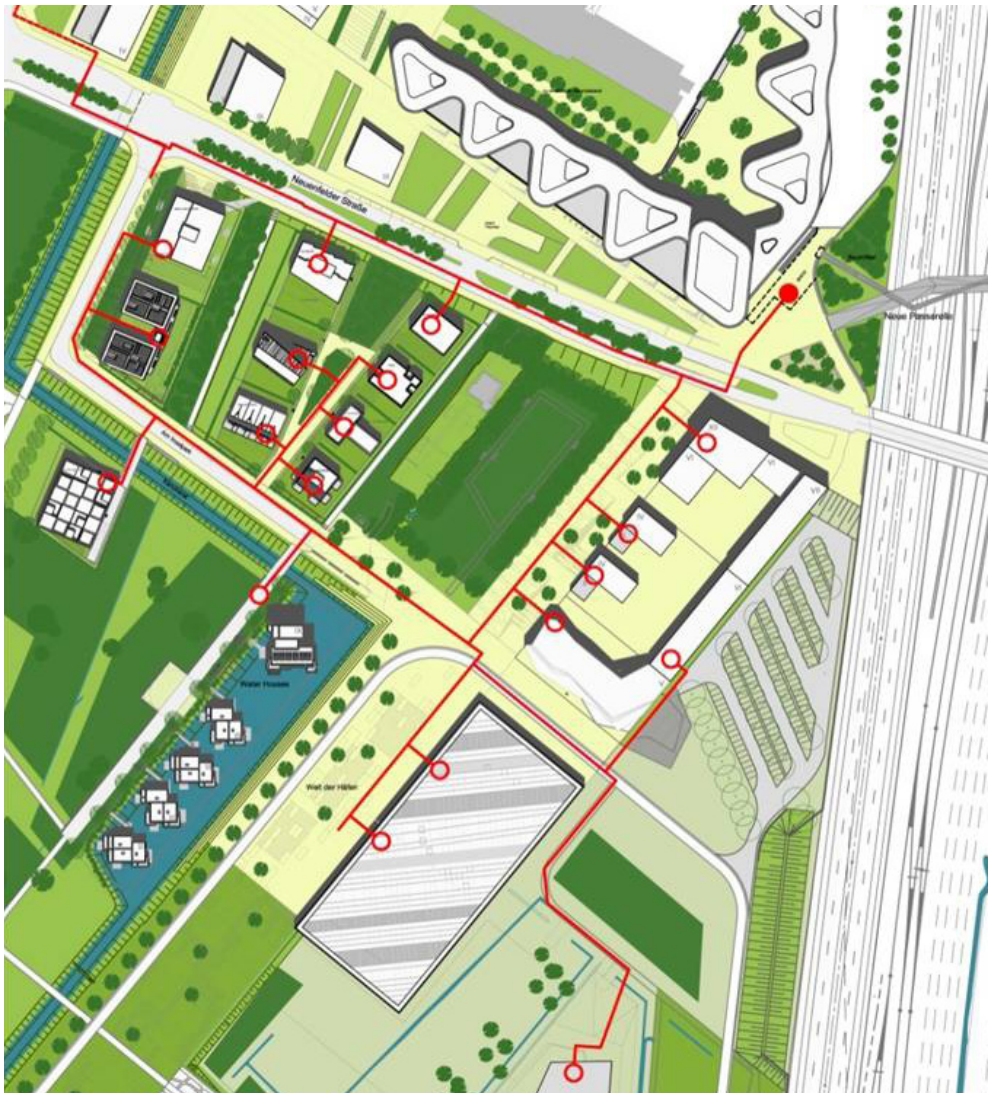

Fig. 9: Schematic view of Wilhelmsburg Central and pipeline network with the BSU in the northeast and the climbing hall in the south

B.4. Energy Feed-In Users

Of the twenty-plus buildings and users connected to the integrated system, three are currently also active in feed-in from time to time. That is to say, if one of these network partners temporarily produces more heat from its renewable production plants than the building and its internal consumers currently need, this excess is fed into the distribution flow of the heating network. In order to make this technically feasible, special heat transfer stations with a feed-in option have been installed between the building and the network. The excess can then be used efficiently within the system to meet the heat requirements across the entire integrated network. All the various energy concepts of the buildings that feed in use smart, flexible and innovative technologies and in this form and size some of them could be realised only within the framework of a higher-level integrated energy network.

B.4.1. BIQ

The "BIQ" is the first building in the world with a bioreactor façade. On two sides of the façade fast-growing micro-algae are cultivated in water tanks in order to maintain energy-rich biomass. These are converted externally into biogas, which can if desired be used as a renewable source of energy. While this technological aspect of the pilot energy plant still has to be tested for regular use, the plant already uses conventional means to acquire solar heat, which is delivered to the building via heat exchangers. In addition, the residential block, built to Passive House standard, uses geothermal heat via a heat pump. The concentrated CO2 that is necessary for the growth of the micro-algae is produced from a biogas boiler, from which heat is fed into the "Integrated Energy Network".

Fig. 10/11: The new-build area (Splitterwerk, Label für Bildende Kunst, Graz) in Wilhelmsburg Central, plus detail of the water tank

B.4.2. Smart is Green

Fig. 12: South side of Smart is Green (Zillerplus Architekten und Stadtplaner, Munich)

With "Smart is Green", too, the requirement for this project was to make the façade an active part of the design of the building – but in a much more complex way than with the "BIQ". In the energy-intelligent façade, alongside climbing plants to provide shade from the sun and new-style short-term heat storage units in the form of Phase Change Material (PCM) blinds, there are also photovoltaic modules in the balcony balustrade and solar heating modules installed on the roof and in the fascia. The renewable energy produced in this way is used to supply the building with heat and hot water. Excess supplies from this Passive House standard residential block can also be stored in a seasonal storage unit filled with PCM in the basement. This material is always on the border between the solid and liquid state and can retain temperatures relatively well over quite long periods. Excesses in addition to this are fed into the "Wilhelmsburg Central Integrated Energy Network" or into two charging points for electric cars in front of the building. Outside the heating period the PCM storage unit is also used to maintain the supply temperature of the cold drinking water. Technically speaking, pure sodium acetate trihydrate with a melting point of 58°C is used as a PCM material.

Project	Size (GFA)	Use	Energy standard	Capacity
1 BIQ (p. 12)	1,600 m²	15 homes	Passive House	50 kW
2 Smart is Green (p. 13)	1,990 m²	14 homes	Passive House Plus	50 kW
3 Water Houses (p.14)	4,640 m²	34 homes	Passive House	34 kW

Fig. 13: The three energy feed-in users of the Integrated Energy Network (map p. 15)

B.4.3. Water Houses

The "Water Houses" demonstrate how waterfront locations can be safe, durable and attractively developed for long-term residential use. Efficient energy supply is also part of the concept, Four smaller triplex units and the nine-storey tower block stand together in a 4,000 square metre basin on the southern edge of the area.

Solar and Geothermal Energy

Passive houses use solar thermal units made up of vacuum tube collectors mounted on the south sides of their façades for hot water supply and geothermal heat pumps for heating supply. Temporary, summertime excesses of solar thermal energy are fed into the "Integrated Energy Network".

Fig. 14: The four triplex houses and the WaterTower by Schenck + Waiblinger Architekten, Hamburg

B.5. Connected Consumers

As far as other connected buildings are concerned, it is a case of more residential buildings and also office buildings, or multi-use complexes and one-off buildings such as a hotel or a sports hall and swimming pool. The impact of this mixture of uses and variety of buildings on the "Integrated Energy Network" is not only the need for different amounts of heating energy but also very different consumption characteristics, for instance with regard to peak load times. Nevertheless, all the buildings are distinguished by their high energy standards and their consequent relatively low energy consumption.

EnEV 2009 minus 30 per cent

All eligible IBA projects meet IBA Criteria of Excellence, according to which their energy design must achieve consumption at least 30 per cent below the current energy-saving regulation EnEV 2009, or exceed this, as with KfWEfficient or Passive Houses. In addition to using the heat supply from the "Integrated Energy Network", many buildings also have the ability to produce their own renewable electricity, for example by means of photovoltaic modules.

Project/new build	Size (GFA)	Use	Energy standard	Demand
4 BSU (Ministry building)	61,000m²	Offices (1,400 employees)	Low energy house	765 kW
5 Medical centre	5,900m²	Shops, practices, homes	KfW-55, EnEV 2009 minus 30%	357 kW
6 Retirement home	9,200m²	141 nursing home places, nursing school, 7 apartments, 60 child-care places	EnEV 2009 minus 30%	201 kW
7 Hall of the Insel-akademie	1,600m²	Homes, multi-use spaces	EnEV 2009 minus 30%	57 kW
8 Wood 5 1/4	3,000m²	2 x 14 residential units	EnEV 2009 minus 30%	223 kW
9 Wälderhaus (Forest House)	6,000m²	Hotel, restaurant, sciencecentre	EnEV 2009 minus 30%	400 kW
10 Sports hall	5,000m²	3-court sports hall	EnEV 2009 minus 30%	580 kW
11 Swimming pool	6,000m²	Public swimming pool, Water polo performance centre	EnEV 2009 minus 30%	1,000 kW
12 Basic Building and Do-It-Yourself	1,670m²	8 - 12 residential units	EnEV 2009 minus 30%	50 kW
13 Case Study Hamburg	1,100m²	9 residential units	KfW-55	50 kW
14 Case Study #1	1,176m²	6 residential units	KfW-55	40 kW
15 WOODCUBE	1,479m²	7 residential units	Passive House	50 kW
16 igs Centre	2,286m²	5-12 office or residential units	EnEV 2009 minus 30%	50 kW
17 Hybrid House	2,500m²	16 office or residential units	EnEV 2009 minus 30%	52 kW
18 Hybrid solution	3,250m²	20 office or residential units	EnEV 2009 minus 30%	140 kW

Fig. 15: The 15 non-feed-in users of the Integrated Energy Network

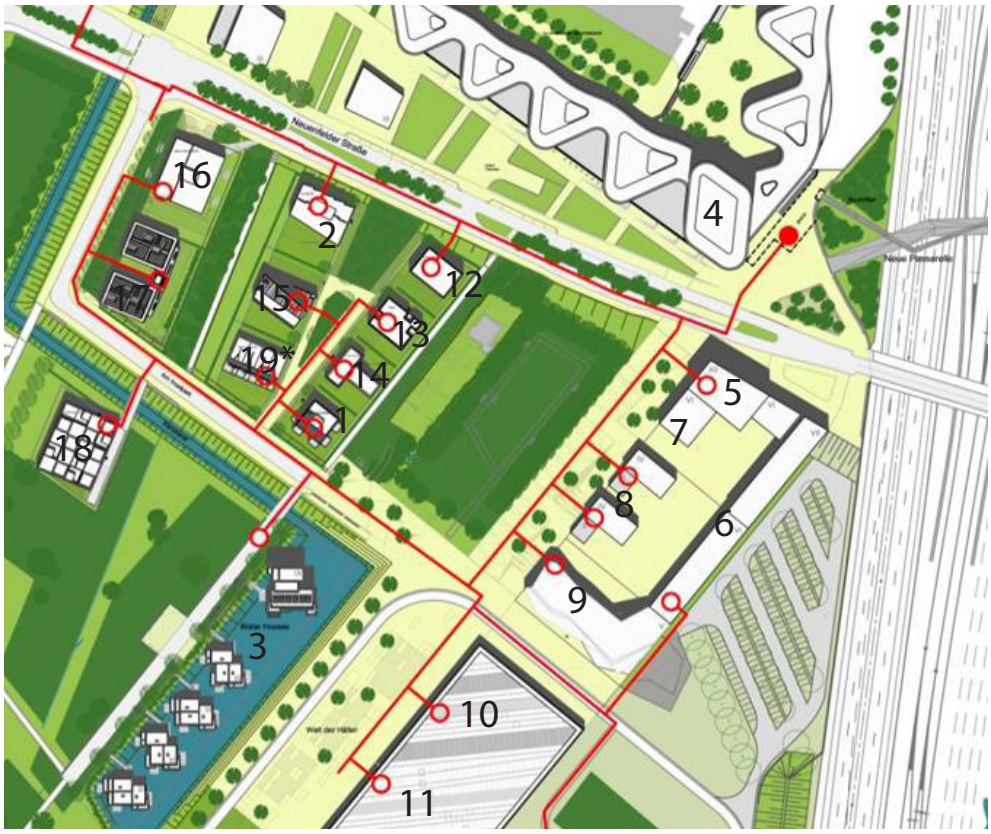

Fig. 16: Users of the Integrated Energy Network (* no. 19, Soft House, was not in the end connected)

B.6. Project Development

The idea of using intelligent integrated energy networks for climate-friendly supply within the framework of the IBA projects was developed early on in the IBA process. In the end, the development of the compact new centre of Wilhelmsburg offered the best framework conditions for putting this kind of pilot scheme into practice.

Connect and Use Obligation

Here, in the course of the urban and conceptual planning for the area as a whole, there was an opportunity to include this kind of integrated network right from the start. For this reason an obligation to connect and use was included early on in the planning stage of buildings. There are exceptions for buildings erected to the Passive House standard, which are allowed a free choice regarding connection.

High Incentives to Participate

Bei besonderen Gebäudekonzepten, In the plans for special buildings that were designed to use a high proportion of self-produced, renewable heating energy, it was possible to have larger production units, as there were other consumers available outside the building itself. In addition, the efficient use of the heat produced and the predominant use of renewable energy in the integrated network leads to CO2 emissions of almost zero and a primary energy factor of 0.3. This results in overfulfilment of the energy-saving regulations, high energy efficiency as shown in the energy certification and considerably improved KfW requirements for their own building projects.

Quality Agreement as Lever

The investors and main users of the buildings in Wilhelmsburg Central were closely involved in various voting meetings as part of the conceptual, technical and economic planning. It was agreed that the network should be constructed and operated by a contractor. The choice was the newly established urban energy provider HAMBURG ENERGIE GmbH, which had since its foundation been very much involved in the supply of local and renewable energy and from 2009 acted as manager for this project. The investors in Wilhelmsburg Central were obliged by the development plan, the invitation to tender for land and design and a binding quality agreement with the IBA Hamburg to participate in the "Integrated Energy Network".

Complex Agreements

In addition, the investors signed a connection contract with HAMBURG ENERGIE, which, as well as dealing with technical and organisational matters, also laid down the prices for the delivery of heating, the remuneration for excess heat fed in and the amount of a one-off connection charge. Because of the lack of practical experience and legal framework conditions for open heating networks, the agreement had to be drawn up in a very complex and lengthy way in order to cover every eventuality concerning the network management and such considerations as balancing services. It also had to clarify questions of whether every feed-in had to be notified or what actually happens if too much or too little energy is fed in.

Biogas Cogeneration for Basic Supply

The overall concept was produced by MegaWATT Ingenieurgesellschaft on the instructions of IBA Hamburg GmbH and optimised and adapted many times during the planning stage. In the end, for reasons of climate protection, basic supply using a biogas-driven cogeneration plant was chosen from four different operation types that were investigated.

B.7. Extesibility and Optimisation

If necessary, the "Wilhelmsburg Central Integrated Energy Network" can be flexibly expanded or even connected with other networks. For example, if the connected partners in the integrated network were to install further or larger solar energy systems, these could be integrated into the network.

Options for Expanding the Network

Potential road extension could lead to supplementary new building in the district and to the west and north as part of future urban development. Network connections to an existing district heating network to the east of the railway, with the planned geothermal system in the southwest of Wilhelmsburg or with the expanded district heating network of the "Energy Bunker" in the northwestern Reiherstieg quarter are also possible and feasible.

Current Research Projects

Monitoring is being carried out for the "Integrated Energy Network" as part of the "EnEff:Stadt - IBA Hamburg" research project. The operating data collected will enable us to draw conclusions about how well the individual components function and where there is still room for potential optimisation in the overall operation and interaction. A second research project, SmartPower Hamburg, is already studying the opportunities for expansion and optimisation within a larger framework. These specifically include deliberations on the merging of individual heating networks in Wilhelmsburg.

Crunch Point Intermediate Storage

In order to be able to make more reliable use of the fluctuating production of renewable energy there is also the matter of (intermediate) storage and the availability of balancing energy for electricity networks. In addition the storage capacity of open heating networks is being studied and there are discussions about whether special consumers, such as the connected swimming pool, could provide a storage option for heating energy.

Availability of Balancing Energy

Bezüglich des Stromnetzes werden vorWith regard to the electricity network, available cogeneration power stations are being operated "electricity-led", in order to be able to supply and sell the essential balancing energy produced by electricity network operators. This means that in the electricity network, when necessary, as many cogeneration plants as possible distributed in a decentralised fashion around the city can be controlled as one large "virtual" power station and the output raised or lowered, for example in order to balance out fluctuating amounts of electricity from wind power for a short period. As combined heat and power production in cogeneration plants also changes heat production, in the matter of an even supply of heat we will in future be even more dependent on intermediate storage.

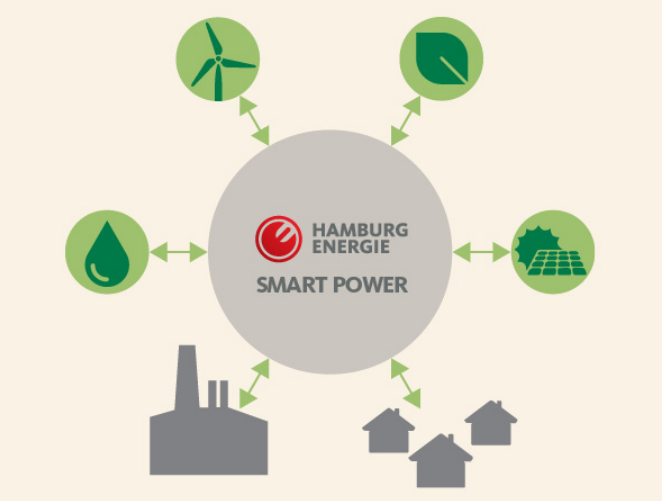

Fig. 17: Simplified diagram of the Integrated Energy Network, including all elements

C. CONCLUSION

The "Wilhelmsburg Central Integrated Energy Network" is a genuinely innovative project, which to begin with could only be realised within the framework of an International Building Exhibition. The opening of the newly constructed network for the feed-in of renewable heat by residents will enable us for the first time to evaluate the experience we have gained with a decentralised heating network and assess it scientifically as part of the "EnEff:Stadt research project – IBA Hamburg". It is al-ready becoming clear that, as expected, the concept of the intelligent networking of the new buildings is achieving positive results for all participants and for the environment. There is still a need, however, for optimisation in various areas like competition rules etc. that could be revealed through the project.

Optional Extensibility

Although there were a few obstacles and challenges to be overcome before realisation, it was possible to implement the basic concept almost unaltered. Only the vocational college to the north of the new local authority building withdrew from the group during the course of the project and refused at first to be connected to the new network. Nevertheless, the network remains optionally extensible in all directions and for all new interested parties. In other respects the early involvement of the district heating network in the planning of the entire new-build district created the optimum conditions for realisation.

Ambitious Climate Protection Goals

Die Zielvorgaben der IBA Hamburg The objectives of the IBA Hamburg were ensured by specific energy requirements in the invitations to tender and agreements with investors. It is perhaps even more important that the targets for the climate protection concept were also linked to specific steps and measures so that the positive economic effects of such projects could be demonstrated early on.

Climate Protection + Economic Efficiency

Because of the great changes in architectural planning, the energy plans of MegaWatt and HAMBURG ENERGIE at first had difficulty in determining network size and output for the calculation of consumption and operational simulations. It soon became clear that the favoured supply via biogas-driven cogeneration plants is not only the most climate-friendly but, within the framework of the integrated network, also beat many other energy sources in the matter of economic efficiency. With the special heat transfer stations with feed-in function in the buildings and the regulatory technology in the energy centre we were breaking new ground.

Lack of Competition Regulations

Besides technical challenges, in order to realise the project it was essential to eliminate the legal uncertainties arising from long-lasting negotiations and complex agreements, because, unlike the electricity market, until now there have been no regulations in the heating market on competition and collaboration in open networks with feed-in from a number of sources. In this respect, in the case of the "Wilhelmsburg Central Integrated Energy Network",, the plans often had to innovate and find solutions for complex issues of network management or balancing.

Complex Implementation Process

It would be good if, in future, it were easier to implement intelligent and open heating networks. In order for this to happen, market players, associations and legislators would have to pursue the subject more keenly and constructively with one another. The IBA pilot project in Wilhelmsburg already shows that, in addition to the developments in the

electricity market, greater liberalisation of the heating market can also drive the energy transformation forward in a meaningful way. Lastly, the heating market covers around 60 per cent of German energy requirements, so there is still great potential for innovation here in the matter of climate-friendly and efficient supply. In Hamburg they are already discussing the possibilities of implementing feed-in and transmission in various large district heating networks in the city.

Fig. 18: Under the forecourt of this building is the centre of the Integrated Energy Network

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