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D2.5.3: Sector handbook of Working Group 3:

District Heating (DH)

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I. Introduction to market sector

Almost 50% of the total energy consumed in Europe is used for the generation of heat. Renewable energy for heating covered 11.9% of total final energy consumption for heating in 2008 and 5.5% of the total gross final energy consumption of the EU-27. Of the 564.7 Mtoe total final energy consumption for heating, 67.8 Mtoe was covered by renewable energy (Eurostat).

District Heating (DH) covers currently supplying 10% of total heat demands in Europe. There are more than 5.000 medium and large scale district heating systems, with an annual turnover of €19,5 billion and 2 EJ (556 TWh) heat sales. However, market penetration of district heating is unevenly distributed. While DH having an average market share of 10 percent in Europe, it is particularly widespread in North, Central and Eastern Europe, where market shares often reach 50 percent and more, even 70% (EuroHeat & Power).

District Heating and Cooling (DHC) is cost-effectiveness and ecofriendliness. The share of renewable energy sources used in the generation of district heat is constantly increasing. At the same time the share of coal and coal products, as well as oil and petroleum products decreased. This development together with the large scale utilisation of cogeneration technologies make DH to one of the most popular sources for heating. The obligation to reduce CO_2 emissions and increase the share of renewable energy, in order to meet European requirements, is regarded now and in the near future as one of the main drivers for the development of DH. An increasing number of national governments have identified District Heating and Cooling as an efficient technology to achieve the main objectives of the European legislation regarding sustainable energy.

IEA*: "District Heating and Cooling consist of pipe networks that enable other technologies such as combined heat and power (CHP) to realise its potential by recycling or reusing waste heat. Energy efficiency results not only in a saving of fuels, but also in a consequent reduction of environmental pollution".*

An international study co-financed by the European Commission confirms the possibility of saving an extra 400 million tons of CO_2 yearly with more District Heating and Cooling across 32 European countries (thus more than the whole Kyoto target). Creating conditions for the expansion of district heating and cooling schemes will thus secure a more sustainable energy system and a brighter energy future (EuroHeat & Power).

DHC using renewables is strongly increasing in Europe. According to European Technology Platform on Renewable Heating and Cooling (RHT-Platform): *In 2020 over 25% of heat consumed in the European Union could be generated with renewable energy technologies and by 2030 renewable heating and cooling could supply over half of the heat used in Europe*. The majority of energy use takes place in urban areas, characterised by higher population density, where district heating and cooling networks represent a critical infrastructure to ensure large scale integration of renewable energy sources. The large majority of renewable heating and cooling will still be produced from biomass sources. RHC-Platform expects biomass use to more than double by 2020, mostly to meet heat demand.

Potential objectives for bioenergy, including a break-down according to the final form of the energy (in Mtoe):

Year	*2007*	*2020*	*2030*	*2050*
Total primary energy consumption	98	220	300	370
Total final energy consumption	78	175	261	357
Made up of:				
Heat (biomass for heat and derived heat)	61	124	182	231
Electricity	9	20	35	56
Biofuels	8	32	45	70

For the market scope of the sector, today there are quite updated but overall District Heating and Cooling statistical data from most of European countries. For instance via the following links:

- Eurostat: http://ec.europa.eu/eurostat
- Euroheat & Power: www.euroheat.org/Statistics-69.aspx
- IEA DHC/CHP: www.iea-dhc.org
- The Ecoheat4EU project (IEE): www.ecoheat4.eu/en and http://ecoheat4.eu/en/Country-by-country-db/Overview
- RHC-Platform: www.rhc-platform.org
- DHC+ Technology Platform: www.dhcplus.eu
- AEBIOM: www.aebiom.org with it´s national bioenergy associations
- National energy associations like in Finland, Finnish Energy Industries: www.energia.fi).

The CrossBorder Bioenergy -project collects and produces detailed DHC data from the point of view of bioenergy. There will be a new GIS system on the project website, making it easy to identify promising bioenergy markets in Europe. Actual datas and links into relevant data are needed for a sound market evaluation will enable companies to adapt market attractiveness to their own needs.

Strongly increasing use of biomass will serve large variety business and growing technology market and export possibilities to the stakeholders. Markets are open for different type and size DHC plants and networks/grids for bioheat, biocooling and CHP (Combined Heat and Power Production).

Key technologies in the DH-sector

The sector´s business and technology area is really large, by scale and size. DH-bioplants with boilersystems need also heat network with pipelines, pumps, heat exchangers, radiators, control and safety equipment, valves, other equipment and temperature meters. Also biomass production and fuel receiving into the plants will offer large amount of variable technology and logistical possibilities for stakeholders. The need of boiler capacities for DH-purposes starts from few hundred kW (thermal) boilers up to many hundred MW boilers (heat-only or CHP).

Today competitive technology for providing bioheat to households, commerce and industry is available, reliable and efficient but has to compete against well established systems based on fossil fuels. Bioenergy can provide both low-temperature heat and steam, and high temperature heat suitable for industrial processes. Small-scale heating systems fired with wood logs, chips or pellets offer good ease of use, low operating costs and are replacing oil heating in many European regions (Ecoheat4EU).

The key technologies of the sector are combustion or gasification of solid biomass and generation of heat-only or CHP. For combustion there are several technologies available (grate firing systems, fluidized bed combustion systems, jet blower firing, gasification systems etc). Same kind of basic boilers are suitable for both Heat-only and CHP plants in medium and large scale plants (min. capacity of 500 KW). More information and about main boiler technology and working principles for biomass plants is shown in the WG 4 (CHP) part of the handbook.

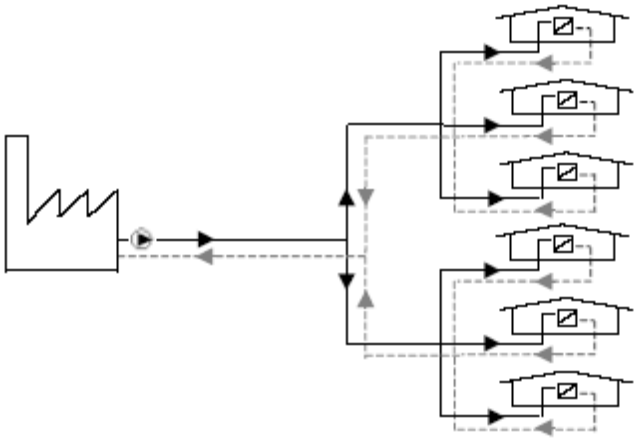
Also biomass production and handling technologies and logistic system markets will serve huge possibilities to the stakeholder´s business over the borders. The rapid development of technologies will enable the production of high quality fuels, energy security, sustainable supplies, clean and effective combustion processes and optimally-integrated solutions for the inhabitants of the communities (households, offices, shops, service buildings and industry).

For small size district heating systems are based on few hundred kW boilers, normally using grate firing technology. The DH capacity suits only for heating few buildings. In larger municipalities heating network is

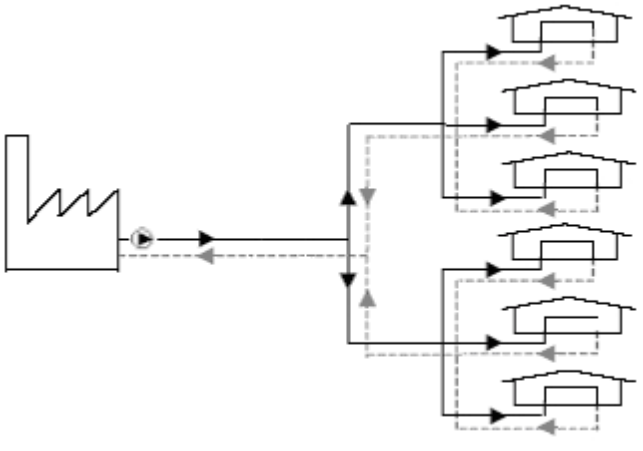
connected normally in a 2-6 MW_{th} boiler, and if it is CHP boiler it can produce also electricity (1-3 MW_e). Boiler type can be grate firing or fluidised bed combustion boiler. In large cities and industry areas boiler capacities reach up many hundred MW_{th} and more often they are CHP boilers with remarkable power capacity.

In District Heating systems customers can be connected to the primary network using two main connection principles:

- Indirect connection of the customer heating circuit to the district heating network: a heat exchanger provides the hydraulic separation.



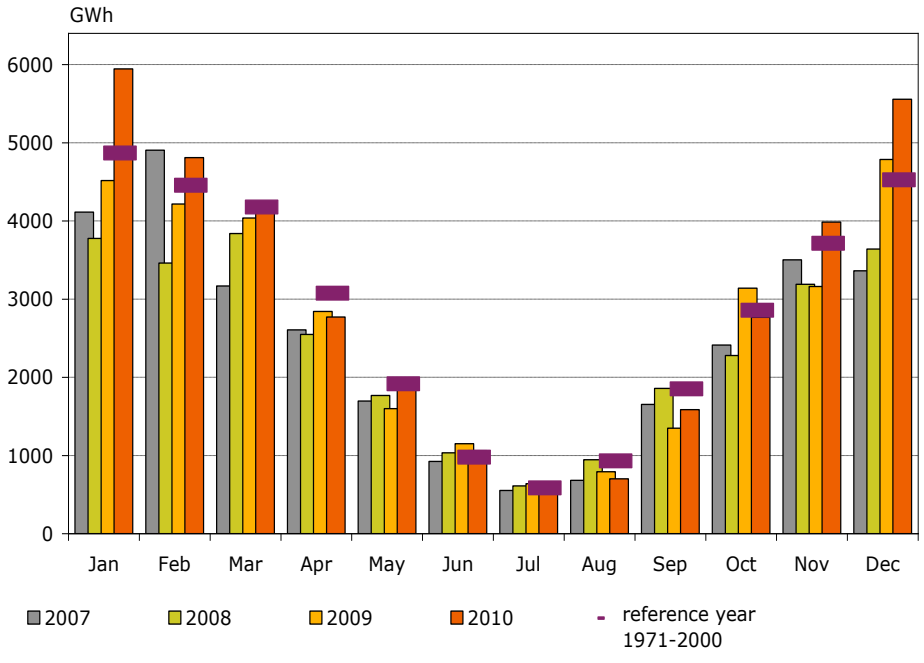
- Direct connection of the customer heating circuit to the district heating network. This principle does not include any heat exchanger, so the same district heating water is inside the secondary network (radiators, floor heating etc)..



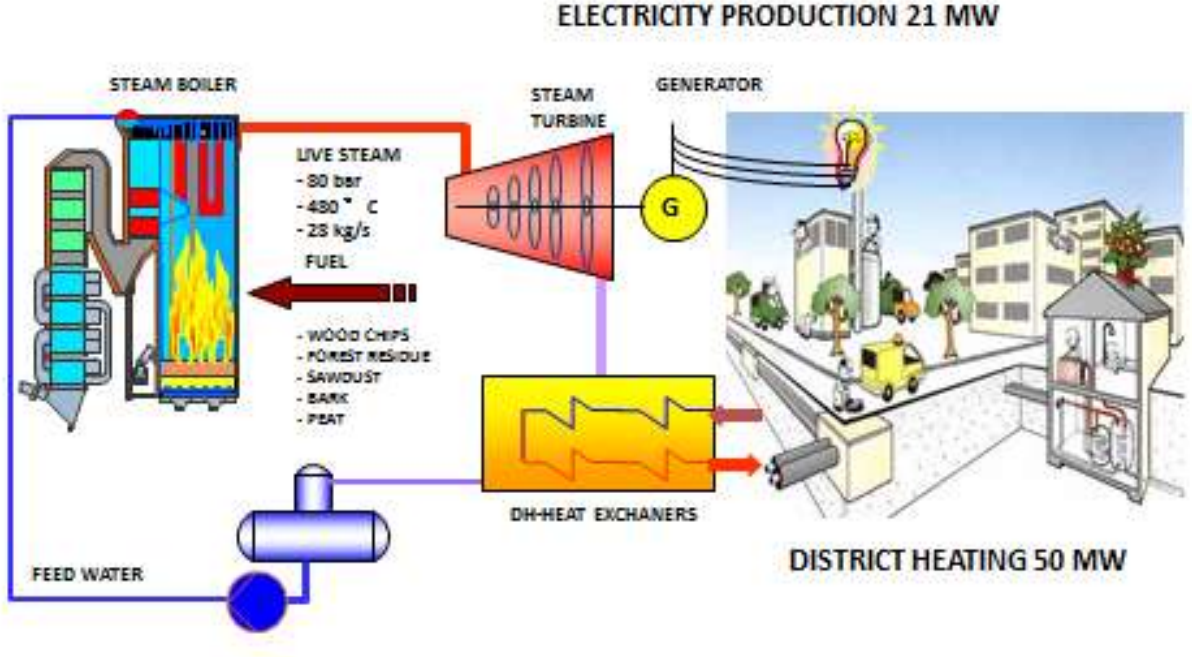
The heat network, especially if it includes efficient and inexpensive hot and cold stores, can operate as storage opportunity for the various renewable energy sources dependent on fluctuations in natural circumstances. This presupposes the effective accommodation of different energy sources at different temperatures. Solutions to be explored include the adaptation of operational temperature levels throughout the entire network and applying innovative types of pipeline configurations (EuroHeat & Power).

CHP will improve the energy efficiency rate in the plant correponding with Heat-only solution. Same amount fuel and more energy. Also have to take into account climatic factors and local heating conditions when planning and investing DH-plants. Heating periods vary very much by countries and regions (from south to north and from see-level to mountains). Normally in summertime a heatload is weak, and energy plant´s cost effectiveness decreases. Possibility to produce also electricity in a same plant will compensate that, and energy producer can run a plant with better energy efficiency.

Monthly district heat consumption in Northern Europe (Source: Finnish Energy Industries)



CHP Power Plant, City Kerava, Finland

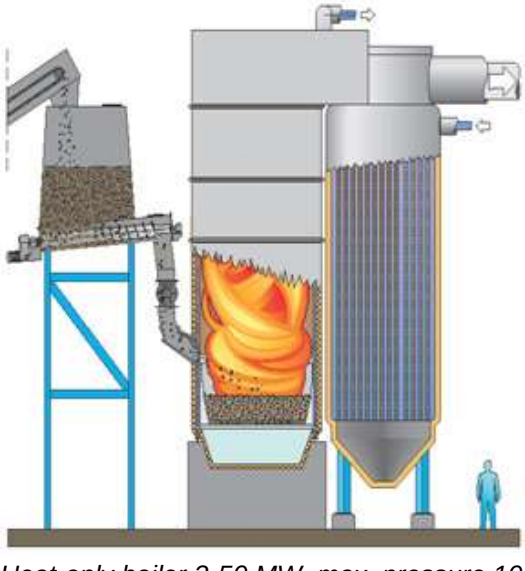


Electricity customers 29 400 and District heating customers 1 320

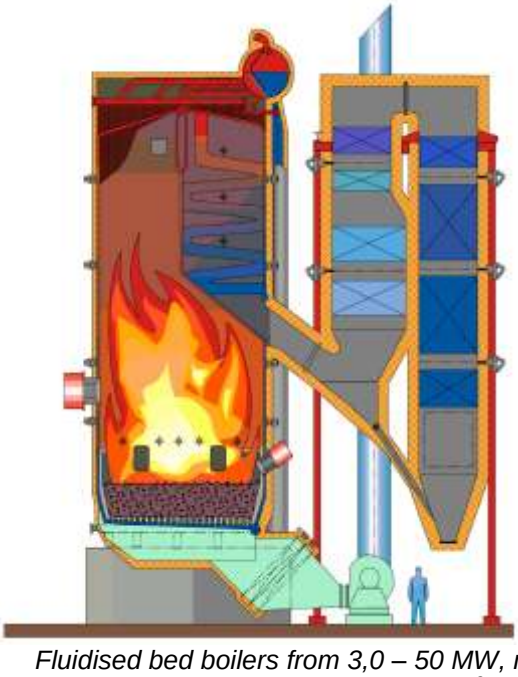
Source: Keravan Energia Oy, Finland.

15 MW_{th} Heat-only plant with a rotating grate boiler. Finland (Metso Biopower Oy).

Small landscape friendly Heat-only plant, Austria (Landwirtschaftskammer Steiermark)



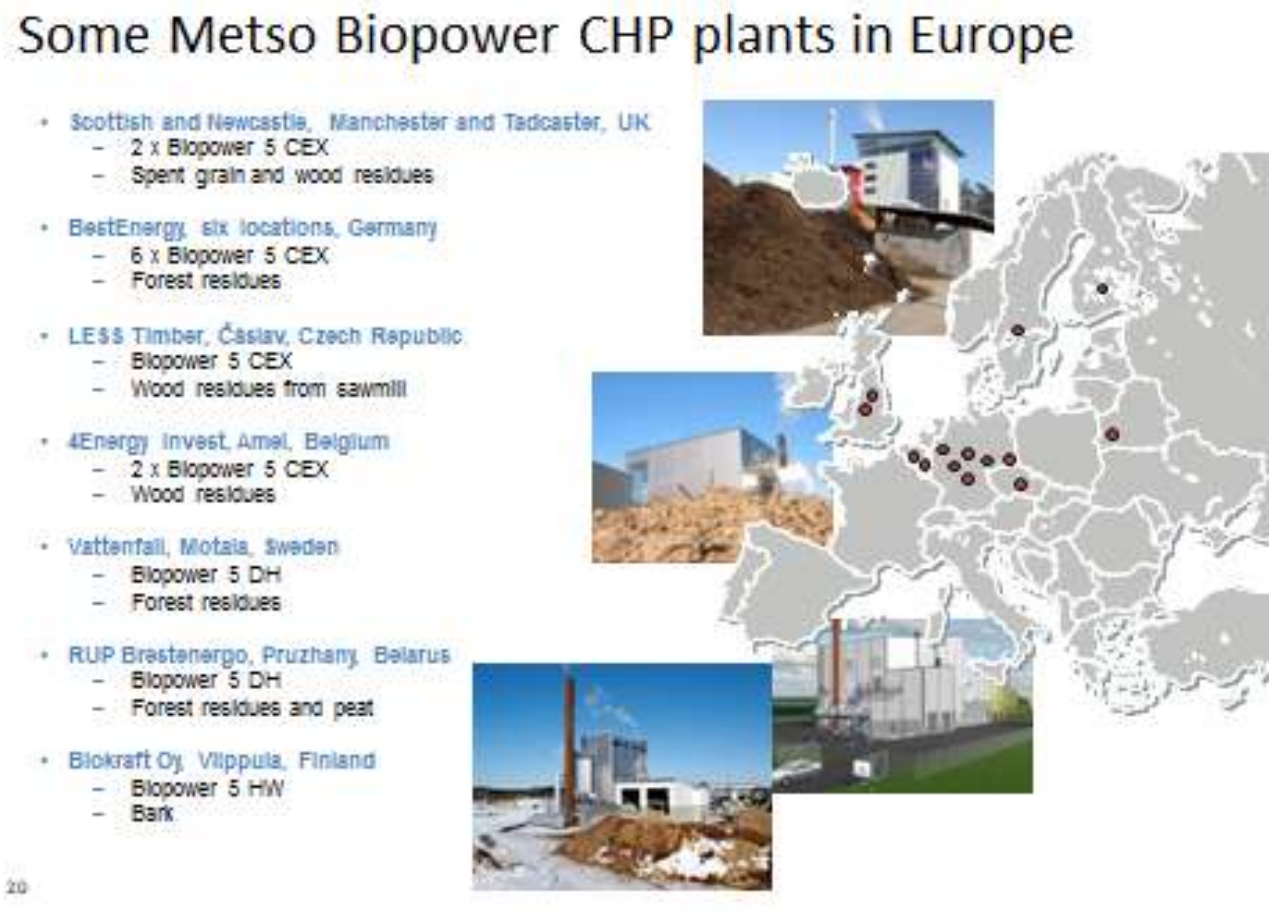
Heat-only boiler 3-50 MW, max. pressure 10-20 bar (g), max. temp. 120-200°C, fuels: wood, bark, forest desidues, peat (Renewa Oy).



Fluidised bed boilers from 3,0 – 50 MW, max. pressure 100 bar (g), max. temp. 520°C, fuels: wood chips, wood waste, peat (Renewa Oy).

The BioGrate combustion system with rotating conical grate is able to burn biomass with a moisture content of up to 60% with high combustion efficiency and low NOx and CO2 emissions. CHP and Heat-only types. Boiler range 4-7 MW_{th} and 5-10 MW_e (Metso Biopower Oy).

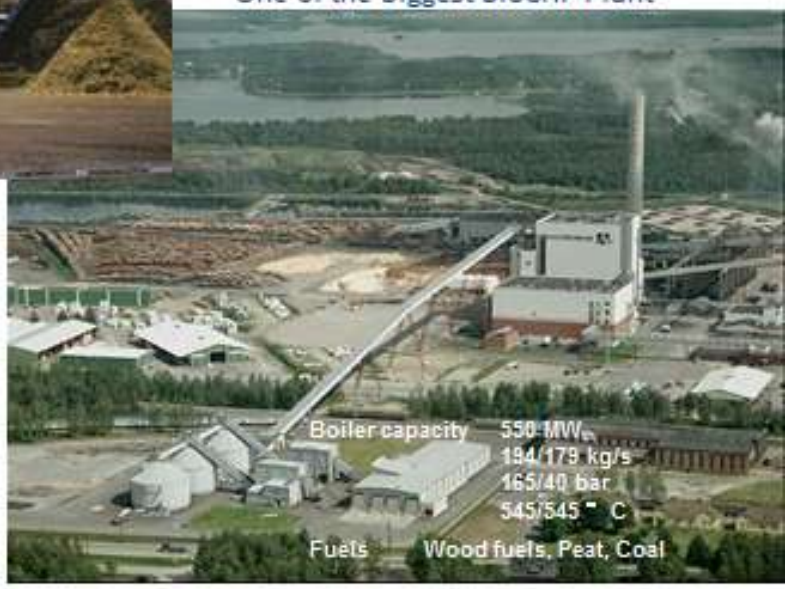
Municipality heating plant equipped with a 10 MW_{th} fluidised bed boiler and efficiency is enhanced by the recovery of the flue gas heat. Finland (Renowa Oy).



Oy Alholmens Kraft Ab

City Pietarsaari, Finland

One of the Biggest BioCHP Plant



Forest industry CHP

Annual Use of Biofuels: 3,5 TWh

Electricity capacity 240 MWe, Process steam 100 MWth, DH 60 MWth

MIKKELI City-CHP: 200 MW, Finland

DH covers 70% of city buildings (inhabitants 50 000)

Fluidized-bed bioboiler
Fuels: wood fuels 50% and peat 50%

Electricity: 62 MWe
District heat: 120 MWth

Target group in DH sector of the CrossBorder Bioenergy project

The CrossBorder Bioenergy project addresses mainly companies in the DH-sector business looking for a long-term commitment abroad, e.g. by investments into foreign branches or developing local market sectors to gain a high market share. Also technology producers who are looking after promising export possibilities in European bioenergy market. Where is a market with an attractive market volume for investments, there is of course also potential for smaller single projects and subcontracting.

Especially providers of turn-key bioplant projects covering all steps of a successful project implementation – from planning and consulting to implementation, operation and maintenance – and project developers are addressed first. These companies will most probably pave the way for many up- and downstream technology providers, component suppliers and service companies, following the pioneering company.

The main target groups are listed as follows:

- Bioheat and power project developers
- Energy companies / DH installers
- Investors and financing organisations
- Planning and consultanting companies
- Technology manufacturers and providers
- Biomass trading and transportation organisations
- R&D specialists in the area
- National bioenergy promoters

II. Characterisation of market sector

Large amounts of bioheat/CHP technology and know-how are needed in the growing and also totally new market. To increase energy and cost efficiencies and to reduce greenhousegas emissions are the remarkable strong driving forces why European energy market is developing and changing so fast almost in every member countries. Main targets in bioheat sector are especially to invest modern bioheat and CHP plants with district heating networks, to replace small and large scale fossil heating systems and to renovate old-fashioned systems by adopting modern biomass heating solutions. In the bioelectricity sector main targets are to push the development of small scale CHP systems based on solid biomass and biogas. Also there are growing need to adapt power generation possibility into existing heat-only plants. Local and international power markets are developing more and more profitable when using renewables. So, the key words of energy producers and customers are to increase energy and cost efficiencies and use as much renewables as possible. Markets are full open for modern bioheat and power solutions and technology, and also for practical know-how. Only problen is to find and contact the right customers who are waiting good proposals for fullfilling their investment plans, reliable good quality technology and systems by reasonable price.

Also the demand for cooling, especially in new buildings with high standards, is growing, Therefore the market for District Cooling is enlarging. In many cases District Cooling represents the most competitive technology to supply cooling energy, in particular when cooling demands are close to the existing network and cheap surplus heat or free and natural cooling is available. A District Cooling system typically reaches 5 or even 10 times higher efficiencies than traditional electricity-driven chillers.

So, new DHC plants fuelled with local biomass are needed. Modernisations of old plants and heat networks are also needed. Large market possibilities exist also for modern technology solutions in biomass harvesting and transporting areas. Operational logistical solutions are needed. Know-how and high professional planning are needed. For small scale district heating systems up to huge CHP investments.

Marketing Scopes for exporting / investing bioenergy technogy to the target countries

- **Little CHP/DH experience** – Such countries may not have undertaken any steps and will need to start by gaining a full understanding of how bioCHP/DH can align with broader policy objectives.
- **Some CHP/DH experience** – Such countries may already have an understanding of how CHP/DH can help meet objectives but have until now only adopted piecemeal approaches to CHP/DH. There might still be significant barriers, lack of experience and/or an incomplete understanding for investing to bioCHP/DH-solutions.
- **CHP/DH success stories** – Such countries will typically have a share of CHP/DH in electricity generation exceeding 25% and more, and are already enjoiying the benefits of this growth. However, there may be minor barriers remaining, but also new opportunities, for example, for expanding bioCHP/DH development in ”DH-fee” urban areas and remote villages.
- **Rebuilding and modenisising** - In all coutries older, less efficient energy systems and networks must be upgraded with the know-how and technology found in the modern systems. Promising business possibilities in old historical downtowns and city centres, and in new suburb areas to adapt CO_2-free modern ”renewable CHP/DH systems”.

The choice of technology for supplying district heat or cool depends on:

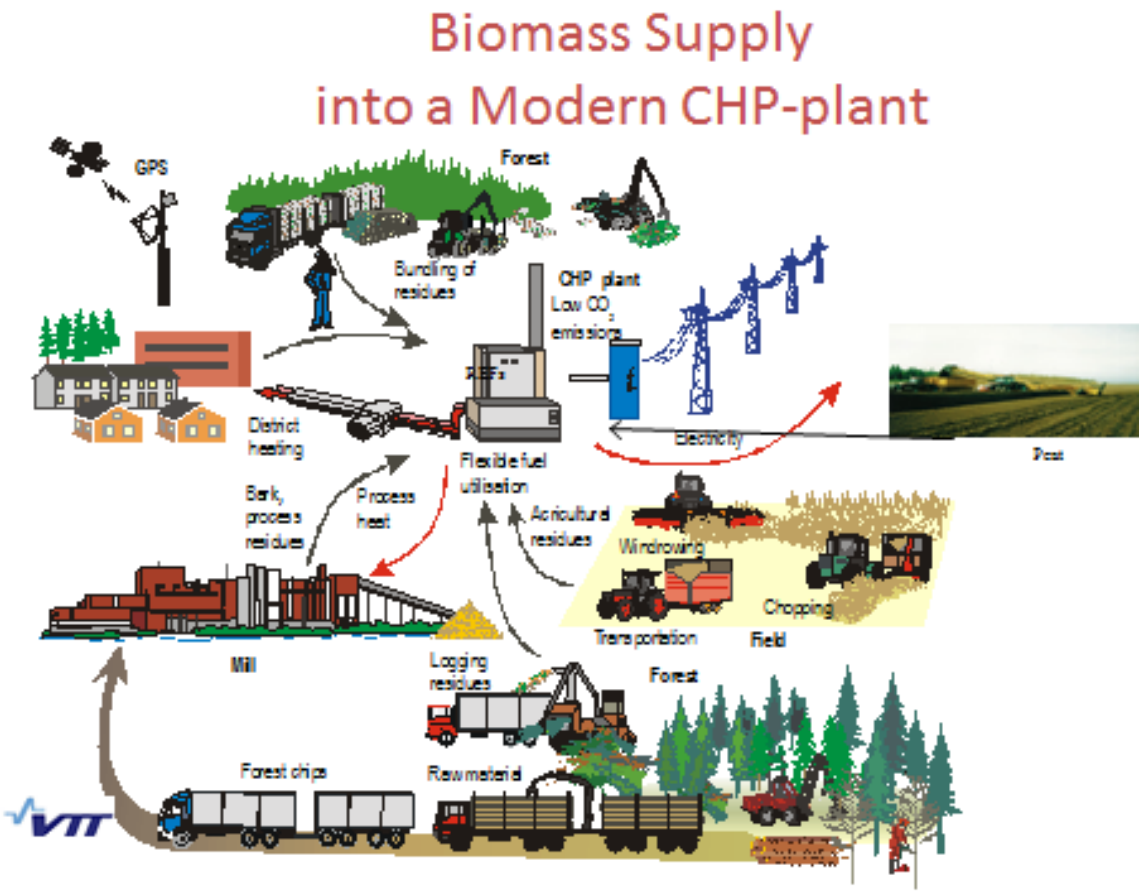
- Area and building infrastructure (urban, rural, industry)
- Local climate and weather patterns
- Customer´s needs and energy market situation
- Good quality biomass resource availability and fuel procurement security
- Proximity to sources of waste heat such as industries etc.
- Insentivies etc. available enough
- Prices of technology and after-sale services

Picture: RHC-Platform

Feedstock used for DH fuelled with biomass

The DHC networks are essential to delivering biomass based energy to urban centres. DHC/CHP systems in several countries are already supplying bioheat and electricity into the use of urban centres with good energy and cost efficiencies. A wide range of biomass fuels or feedstock are available for use in modern DHC systems: different kind of energy wood straight from forest, wood process residues, short rotation forest wood, energy crops, straws and crop residues, industrial and municipal solid biowastes, animal wastes, olive pits, corncobs, pruning etc. Biomass fuels will play a major role in any renewable energy future.

Medium and large scale bioplants (over 5 MW) can use large variety of biomass sources, either alone or mixed fuel. Fuel receiving and boiler technology order mainly the suitability and minimum quality demands for the acceptable fuels. Small DH-plants need more so called high quality fuels (pellet, wood chips, billet etc). In normal bioDH-plants there can be use different kind of forest fuels (wood chips, wood residues, and even crushed stumps), industrial by-products (sawdust, bark) and pellets. Also recycling woody materials are suitable depending on the chemical contents and the limitation orders. However, for large-scale DH/CHP plants a secured fuel supply is crucial. Because of the low energy density in comparison to fossil fuels, the lengths of the transport ways are economically limited and it has to be sure that enough biomass will come in every case to the plant as expecting when making the final investing decision. In the project´s criteria and indicators -list there are many questions regarding feedstock and biomass potentials in the target country/region.



III Criteria and indicators for market attractiveness

The evaluation of market attractiveness for bioheat and CHP is a complex issue, various aspects have to be considered and information collected. For SME which have decided to expand on international markets but haven't identified a suited country yet, this selection process can be very time and cost intensive and moreover, if these companies haven't gained any experienced in market assessments so far, important key factors can easily be ignored.

From there, within the CrossBorder Bioenergy project relevant categories and criteria have been elaborated with support of market established company stakeholders which will give guidance on what to consider and to look for in the market evaluation process. Following key factor categories were selected:

1. Country profile / risk
2. Institutional environment
3. Energy market
4. Feedstock market
5. Market saturation level
6. Financial market and local support

Country profile / risk

There are many aspects to be regarded on a macro-level, out of which the profile of the country itself in terms of Gross Domestic Product, economic development and education level of the sector. Higher costs linked with RES in general are usually only accepted by the public in a period of welfare and positive development expectations, while in times of economic slowdown or depression short-term cost savings and social safeguard are put in the foreground. Linked to that is the question of credibility and reliability of a country, respectively its company stakeholders as partners for international business cooperation. How secure are investments into a foreign country, how likely is a payment failure? What risks can be waited ahead? Crime or corruption risks? With view on the financial risk of investments into foreign markets, the currency exchange risk has to be highlighted as well. Another financial risk arises with steadily growing inflation rates, which not only reduces the purchase power of potential customers, but also abate the value of the company's assets, once acquired with the market entry process. A stable or even declining inflation rate over a period of time is accordingly another valuable indicator to avoid negative financial impacts on the investment.

Institutional environment

Political regulations play an important role for the accelerated development of RES. Clear and binding targets for the RES sector or even single technologies are a strong driver for investments. But of course these targets have neither to be undemanding, nor exaggerated or unrealistic. National Renewable Action Plan is an important indicator for the wholeheartedness of the political will. Though many policy makers wish to develop the bioenergy sector, the production costs of bioenergy are still in many cases higher compared to fossil competitors, investments into the biomarket therewith linked with a significant higher risk. These risks wouldn't be accepted without a minimum security for the investment, e.g. in form of a support scheme which covers these extra costs or provides a long-term calculable cash flow within the pay-back period of the investment. Another important fact is whether or not the targets and action plans were transposed into adopted support schemes or regulations, that is

to say: Is there a sufficient support scheme implemented, or not? Last but not least existing support schemes or their conditions must not change too often along a minimum period of time, as this again wouldn't contribute to the investors' confidence and hampers the investment security. Steady and reliable support schemes are of utmost importance to evaluate and accept the risks, otherwise the potential would remain untapped. And due to the variety of different regulations and requirements, but also because of the various state of knowledge at the authorities, the duration and efforts of the approval procedure can be very different from country to country. For planning a bioplant it is naturally important to get the allowance as soon as possible to avoid running costs and the risk of changing framework conditions during the time between application and approval.

Energy market

Beneath the feedstock supply, the structure of the energy market is a decisive criterion for an investment decision, too. Due to the high flexibility in the energy markets by countries, there are many issues which can be considered, but there are generally spoken three aspects which are important to analyse: the available energy infrastructure and its rules, the development of the fossil competitor and competition with other biomass users already active in the market. The heat market can generally be an attractive market for bioplants as well, as energy producers are more and more keen on to operate the plants as CHP to increase income and to lower the economical risks. If the target is also electricity production, it is first of all important to know how the electricity market has developed in recent years and how it is expected to develop. Are there already new power plants announced, or are existing plants already out-dated and due for replacement? Electricity has to be sold to the common market. It is optimum if an electricity grid is available close to the plant to avoid costly grid connection costs. And as experience has shown, if there aren't clear rules defined for plant owners and grid operators on the costs, rights and duties of grid injection and transportation, the denial of the grid access has often proven to be the bottleneck for a successful development of the RES electricity market. Nevertheless competition with fossil fuels in the energy market must not get lost out of sight, of course, which indicator is its price development over the recent years and into the future. A good investment climate exists, where prices for fossil fuels have risen steadily and are expected to grow further on. If then these fuels are in addition to that also based to a large extend on imports, the economic pressure arising out of it paves the way for investments into bioenergy technologies. On the other hand, a high share of available domestic fossil fuels or their low prices, maybe even due to financial support to lower social impacts, can be seen as an intense market barrier. A low number of competitors in a market with high volume can usually be seen as good opportunity. On the other hand, a strong competition in the sector already indicates favourable framework conditions and a running market. Therewith, the interpretation of the market analysis depends very much on the existing market volume and the investor's strategy.

Feedstock market

The availability of biomass in a sufficient amount and qualities is crucial. So the different kind of feedstock potentials should be calculated separately and required biomass capacities into the energy plant should be confirmed. In addition, to be attractive for foreign investments, the biomass potential has to allow a critical market volume for the investor. To justify the costs, efforts and risks of investing into a foreign market, there has to be potential to sell enough outputs to the local market. The feedstock potential of a region has to correspond with this requirement accordingly which demands that the biomass already used for existing plants or other applications has to be deducted from the theoretical potential as well. Biomass has to be transported to the plant, a dense infrastructure suited for related means of sufficient transportation like truck roads, railway lines or waterways is needed.

Market saturation level

When looking export possibilities over borders, it is important to know and should investigate what kind of DH-markets are in the target country. Important issues when detecting the market saturation level are, what is an average DH rate in the country and a region company is looking after. Are there consumption sales break enough for my technology or investment? Are there free heatload for district heating in the possible area? Are there already wellknown national technology producers and companies in the sector? What kind of strong competitors are already in the market? Are there cooperative or subcontracting possibities? Luckyly almost in every case and from country to country there will be at least promising opportunities and sub-markets for high quality modern bioenergy technology and solutions.

Financial market and local support

Financing possibilities and possible supporting tools in the country are one of most important key issues, when planning investments or sales over borders. National and local financing availabilities for new bioenergy business and investment, also possible EU fundings, are often essential for the whole project. Furthermore without financial or regulative support the operation of a bioplant wouldn't be profitable in most cases. However, bioenergy competes already successful against fossil energy in many European countries. Continuously increasing fossil fuel prices, extra taxes, emission penalties etc have changed and will change the competitiveness of bioenergy more and more better way. With the help of RES directive and national renewable energy action plans, strong driving forces in member countries. But still today in some countries, due to the higher energy production costs, the economic risk for investments into bioenergy projects is fairly higher compared to already market introduced, fossil energy carriers. With view on the long-term payback-period for the investments, potential investors will feel a delicacy about spending their money without having a minimum of planning security. Same is true for the financing of projects by banks which won't dare to grant credits to risky projects or will demand unfeasible charges to cover the risk. Consequently, a country which has successfully implemented a support scheme addressing this fundamental disadvantage is very attractive for investors resp. technology providers. In addition, to manage the risk of volatile prices, for many investors the price transparency of markets is an important factor, too. What are financing availabilities for new business development? Investment subsidies? Inflation and bank sector risks? Is there a market place where prices both for feedstock and energy are published?

IV. Market criteria and indicators

To evaluate and compare the attractiveness of markets in different countries common assessment criteria translated into measurable and therewith comparable indicators have to be defined. This was done during the Cross Border Bioenergy project with support of company stakeholders of the target groups, who identified the key information needed by them and consulted with the implementation of the data into a practicable tool. Certain the most important key factors categories were selected with criteria and indicators.These categories are:

1. Country profile / risk
2. Institutional environment
3. Energy market
4. Feedstock market
5. Market saturation level
6. Financial market and local support

Criteria and indicators per key factor categories are as follows:

1. Country profile / risk
   1.1 Criteria: Country profile and policy aspects
   - Indicator: Geography / Climate / Population rate
   - Indicator: Market governance stableness and predictability
   - Indicator: Is political interest in renewables energy high / low (today and nREAP)?
   - Indicator: What kinds of logistics conditions, structure and systems there exist?
   - Indicator: Corrupting and crime index
   - Indicator: Inflation rate during last 5 years and expected?

2. Institutional environment
   2.1 Is the political intention to the extension of the according market sector visible?
   - Growth according to the National Renewable Energy Action Plan (nREAP): Percentage change of the energy demands by sources from today to 2020?
   - Growth according to the nREAP in the field of renewable total final energy consumption in the sector of bioheating and cooling from today to 2020?
   - Growth according to the nREAP in the field of renewable total final energy consumption in the sector of bioelectricity from today to 2020?
   - Percentage part of the power generation, according to the nREAP, from bioCHP plants in relation to the total power generation for the year 2020.

   2.2 Are the political framework conditions reliable and supportive of renewables?
   - How have the important framework conditions for investments in bioheat and CHP projects changed in the previous years?
   - Will the framework conditions for bioheat and CHP projects be changed significantly in the near future (next 5 years)?
   - Are there skilled local labour resources available enough for the investment?

   2.3 The licensing procedure is temporally appropriate?
   - How long does an average licensing procedure for CHP and Heat-only plants (with heat network) projects take in the country (Only the duration of the permission by the authority; finished plan of the plant and without negotiations of feed-in tariffs)?

3 Energy market

   3.1 Is an access to the heating grid ensured?
   - Are there priority rules for renewable energy in the heating sector (national/region)?

   3.2 Is an access to the grid ensured?
   - Are there priority rules for renewable energy in the electricity sector (national/region)?

   3.3 Are the emission regulations in the target country unequal with the export country?
   - Sector business over borders has been in low level or decreased during last years?
   - Official certification or standardisation in the business area are lacking or unfinish?

   3.3 Availability of bioenergy is foreseeable
   - Energy supply is dependable and support green energy solutions?

- Distribution networks for district-heating are prepared for increase bioenergy production and usage
- Distribution networks for electricity are prepared for increase bioenergy production and usage

4 Feedstock market

4.1 The biomass potential is big enough to realize bioDH projects?

- Theoretical and practical amounts of different biomass sources for district-bioheat and CHP potentials - today and estimated up 2020 (national amounts and imported)?
- To what extent will the domestic availability of wooden biomass of forestry change of today to 2020 (in %)?
- How much is the average fuel proportional to the average feed-in tariff in percentage?
- How much are the average fuel prices for solid biomass, €/MWh?
- How much are the average feed-in tariffs and other subsidies in €/MWh for bioCHP and Heat-only plants today and up to 2020 (nREAP)?

5 Market saturation level

5,1 The bioenergy market offers good growth perspective

- The rate of existing district heating systems in the country and average rate percent in the cities and larger municipalities
- There is large enough biomass and DH- market for existing systems and newcomers
- DH plant and heat network potential in the country (nREAP), new ones and re-building

5.2 BioDH and CHP has access to competitive downstream flow

- Laws regulate to adapt new systems / bioheat and CHP?
- Public incentives and opinions strongly support new bioheat systems?
- Biomass potentials availability and quality standards rate
- Logistic available for new bioheat regions?
- Enough local receivers/customers of district bioheat exist by regions?

6. Financial market and local support

6.1 Local quality requirements affect on bioenergy and biomass heat / electricity production

6,2 Financing availabilities for new business development exist (national and local)

- Investment subsidies for new production capacity/plants are available
- Investment subsidies for investments in logistic and biomass production are available
- Governmental guarantees for loans for bioheat investments

6.3 Financial support schemes can be claimed for operation

- How high is the legally guarantee price for heat?
- How long is the guaranteed duration of the shceme?
- How high is the legally guaranteed price for DH heat nased on biomass?
- How long is the guaranteed duration for the scheme?

6.4 Incentives for bioheat and electricity make them favourable in end market

- Tax is reduced for bioheat and bioelectricity?
- Investment subsidies etc for to the customers when choosing renewables?
- Public grants for customers available?