DAY 1, Parallel Session III

Second Part

Utilisation of Biomass, Practical Examples
(CHP, WWTP, DH, Central Heating, Stakeholders)

Jan Ilavsky	**Chairperson**
Kristian Kaerrsgaard Hansen	Practical Experiences from a Danish Biogas Plant
Jan Ilavnsky	Finish DH Project Applications
Gyula Nyerges	Straw Combustion Boilers Utilisation in Hungary
Eduard Majer	Utilisation of Biomass in Central Slovakian Municipalities
Milan Oravec	Development of Energy Utilisation of Biomass in Slovakia

Hashøj has a CHP- plant and biogas- plant that are adjusting to the future.

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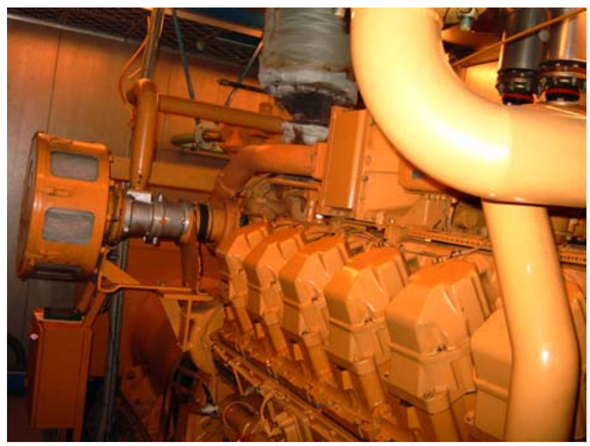
In Denmark many small CHP plants struggles for survival in a time with a very low price on electricity and therefore a high price on heat, to maintain the credibility of the plant. But that gives the CHP-plants some special problems to deal with.
A visit to Hashøj CHP –plant shows what their situation are, and how some of these new perspectives, are to be solved. The CHP-plant operates together with a biogas-plant. The biogas plant has also made some investments to meet the problems that a liberalised market for electricity will make for a supplier of the basic energy for producing green electricity.

The Hashøj CHP and biogas plants

The centralised biogas plant in Hashøj is owned by an independent co-operative, Hashøj Biogas A.m.b.a, with 17 members, all farmers and slurry suppliers. The aim of the co-operative was to build and operate a biogas plant to facilitate redistribution of animal slurry in the area and to provide investment grants for the establishment of slurry storage capacities.

The plant is part of the demonstration programme for Danish biogas plants, aiming to demonstrate combined biogas-natural gas fuelled CHPplant. The biogas plant receives slurry from 10 pig farms and 6 cattle farms in the area. The process temperature is mesophilic, at 37°C. The biomass mixture consists of cattle and pig slurry, intestinal content from pig abattoirs, fat and flotation sludge from pig abattoirs, fish and food processing industries, dairies etc. Before digestion, the biomass mixture passes through the pasteurisation tanks for one hour, where effective pathogen reduction is ensured at 70°C. The farmers have overall positive experience of using digested biomass as fertiliser. The product smells less, is sanitised, homogenous and with a defined content of nutrients, which makes it easy to handle and to integrate in their individual fertiliser plans.15 -20 % of the digested biomass is sold each year on a contract basis to 5 crop farms in the neighbourhood.

The biogas produced is utilised for CHP-production at the newly established plant in Dalmose, where tree biogas and natural gas fuelled engines supply app. 400 consumers in Dalmose and Flakkebjerg with heat. And the electricity is delivered to grid, for use in private households as well as in industries.



Pic. 1: Caterpillar engine 760 kWe power

The biogas represents about 38% of the fuel consumption. The biogas plant is owned by the above mentioned farmers on a nonprofit basis, but of course they have some benefits towards their farming business. The CHP-plant , on the hand, has a non negotiable agreement to use all of the biogas produce at the Biogas plant.

Since 1995 the biogas plant has been modernized in several ways. Headlines are:

- New smell treatment storage tanks has been established.
- New reactor with a volume of 4400 m3
- New flare burners installed
- New receiving facilities, for automatic unloading.

All has been done to insure a steady and reliable supply of gas to the CHP-plant.

And the CHP-plant

- Adjusted gas input caterpillar engine so any mixture of NG and biogas is possible

- Weather station to regulate the district heating grid with an integrated fuzzy logic control
- Adjusted gas input to the Ulstein Berger engine so any mixture of NG and biogas is possible - see picture 2
- Adjusted gas input to the Danstoker boiler so any mixture of NG and biogas is possible
- New wood pellets boiler of 1 MW installed.
- New heat piping to the biogas plant for heating the slurry to 37-40 degrees.


Pic. 2: 3-way valve for fully mixing natural gas and biogas rig

The aim of all those efforts is to secure a maximum utilization of biogas and less use of NG and oil. The prize taxation in Denmark is a so-called 3-parts prize policy. The prize are divided in low-, high- and peek periods in fixed periods of the day and week. This prizing secures somehow the budgets on CHP-power production with an additional 17 plus 8 øre (25 øre) of subsidy. But when then liberalized electricity market is fully implemented, the prize will varies from hour to hour. That is a large challenge for the power production to adjust to such a variable prize structure. But especially the adjusted gas input, in witch the motors can use from 100 percent to 0 percent of biogas in combination with natural gas, the production could be optimised when the power prize change rapidly.

Main data

Biogas – pic. 3

Animal manure ....100 tons /
Alternative biomass ....38 tons/
Biogas production ....3.0 mill N m3/y
Digester capacity old.................................... 3000
New... 4400
Process temperature 37
Pasteurisation .... MGRT 1 hour at 70
Gas storage capacity 2200
Utilisation of biogas...................CHP-plant/gas bo
Transport vehicle ....One 20 m3 vacuum tan
Average transport distance................................. 4
Initial investment cost .... 21.8 mill. D
Government grant .... 5.1 mill. D
Other investments cost 1995-2003...... 22.0 mill. DKK
Contractor ....Krüger Ltd.
Operation start-up 1994

Pic. 3: Biogas plant in Hashøj

Pic. 4: CHP plant – notice the accumulator of 655 m3

The CHP plant – picture 4
Motors/boilers .... Caterpillar 760 kW_e/1200 kW_{th}
..................................Ulstein –Berger 2 MW_e/4 MW_{th}
.... Danstoker 4 MW_{th}
....Danstoker/Linka 1 MW_{th}
Heat storage tank 655 m3
Consumer’s.. app. 400
Initial investment cost ....55.0 mill. DKK
Other investments cost 1995-2003 app. 5-6 mill. DKK
Operation start-up.. 1993

Heat and power sold in Hashøj / Dalmose – Flakkebjerg

As seen on the diagram 1: district heating production degree days cor. with 15 GWh pr. year. and increased to app. 18,5 GWh pr. year, but in the past 2-3 years it seems like an decrease of sold heat has take place. A possible reason for that is that in Denmark, the price on electricity has lowered a lot, and to maintain the liquidity in a CHP plant, witch is costumer owned, it is forced to raise the price on heat. That is a beginning of a bad spiral, because a high price on heat will animate some consumers to use more firewoods in the livingroom stove. And that will cause the heat demand lower furthermore.

Despite that Hashøj CHP has a positive approach to the future, they just finished a pellets boiler which can supply up to 30% of the heat to a reduced price. and that the production of electricity is app. 13-14 GWh pr. year.

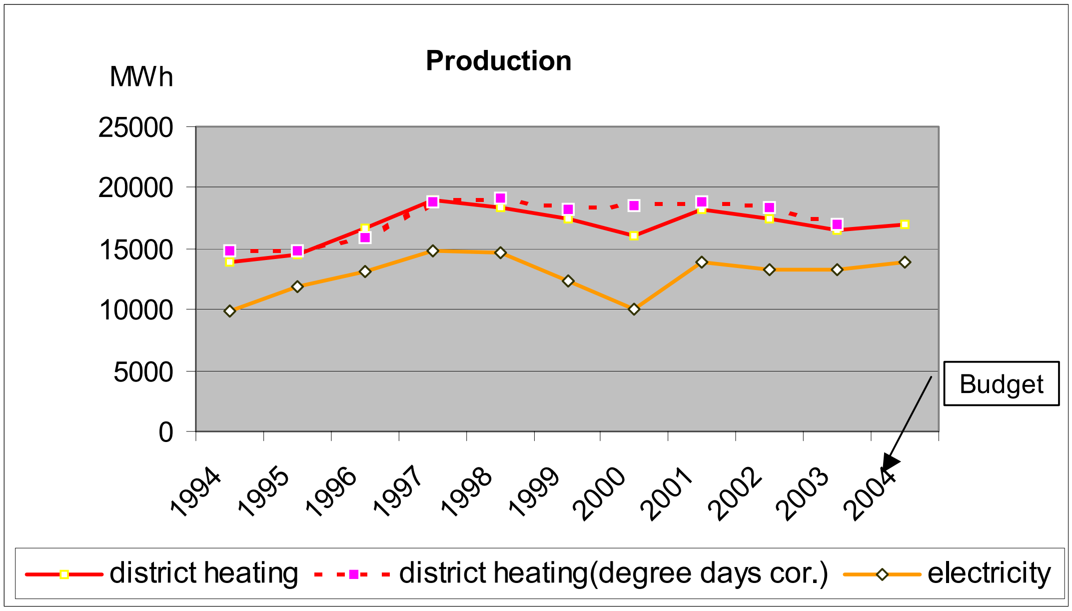


diagram 1: Sold energy

The energy used for producing the heat and power is visualized below in diagram 2. And it is significant that the consumption of natural gas is decreasing except in 2001, when the heat demand was quite low. And a larger share of the heat and power produced was made from biogas. The late years has shown that prizing on natural gas was so high that the days with an overproduction power, in compare with production of district heating was minimized. The CHP plant has a possibility to produce power and discarding the heat if the pricing on power is very well.

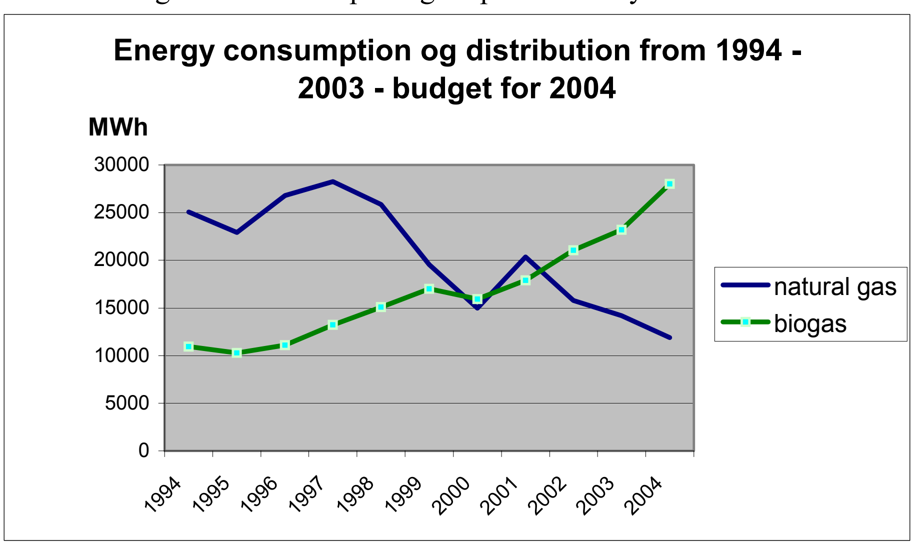


diagram 2: Biogas and natural gas consumption in the CHP -plant

And instead the consumption of biogas has increased to 23200 MWh, corresponding to app. 3500 Nm3 biogas. With the new investments on the biogas plant the production/consumption in 2004 will be around 4200 Nm3 biogas pr. year.

Conclusion

The Biogas plant and in connection the CHP plant has optimised their ability to produce electricity and heat on a environmental and hopefully cheap way, so that the companies can maintain affordable district heating, in that way it will bend the heat curve upwards and giving the most promising foundation for selling electricity in a competitive world.

References

Talks to administrator mr. Erik Lundsgård
Numbers from mr. John Rosing

BIOMASS UTILIZATION FOR ENERGY PRODUCTION IN FINLAND

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Summary:

Renewable energy, wood based fuels in particular, play a key role in the Finnish energy and climate strategy. The Wood Energy Technology Program was launched in 1999 to promote the use of forest fuels by means of research and development. The goal of the Program is to use annually 5 million solid cubic metres of forest biomass for energy (10 TWh) by year 2010. Currently renewable resources constitute 23 % of the use of primary energy in Finland. It is envisaged that the Wood Energy Technology Program will result in increasing to 27 % in 2010. During the first four years of the programme, the annual use of forest chips has increased from 0.5 million to 1.7 million m^3 annually. The current overall consumption of wood residues from forest operations and wood processing is as much as 37 million m^3/a of which 17.7 Mm^3 is made up of black liquor, 8.0 Mm^3 of bark, 3.1 Mm^3 of sawdust, 0.2 Mm^3 of recycled wood, 0.05 Mm^3 of pellets and briquettes, 5.8 Mm^3 of traditional firewood and 1.7 Mm^3 of forest chips. Additionally, the technically harvestable biomass reserve is estimated to be 10 – 16 million m^3 depending on employed criteria for calculation. Four main alternative production systems of forest biomass have been studied and developed – chipping in the stand, chipping at the landing, chipping at a terminal or plant and bundling of forest residues. The development of the bundling system of logging residues has been one of the key areas of technological development.

National energy policy focused on renewable energy sources

Finnish energy policy is aimed at securing a competitive energy supply, while concurrently meeting international commitments. To do this, it encourages diversity in the energy production sector and promotes self-sufficiency in the energy supply. Aditionally, it promotes the use of renewable energy sources and energy conservation by different means such as tax and investment incentives as well as launching and supporting research and development programs.
Finland is the forerunner among the member states of the European Union in the utilization of bioenergy. The goal of the European Union is to double the use of renewable energy from 6 % to 12 % by the year 2010. In 2002 as much as 23 % of

energy was generated from renewable sources in Finland(Statistics Finland, 2003). In the case of electricity the drafted indicative goal in Finland is to produce 31.5 % from renewable energy sources by the year 2010. In combined heat and electricity production (CHP) the European Union aims at doubling its production to 18 % of the total electricity generation, while in Finland one third of all electricity is produced through CHP. Just over half comes from district heating units and the rest from CHP power stations of the industry. The forest industry, in particular, uses its by-products for energy generation very effectively, incinerating black liquor, bark, sawdust and forest residues. The current energy generation based on renewable sources is a good basis for the new national promotion program aiming at a share of 27 % of renewable energy sources in 2010 (Enestam, J-E., 2003).

Progress based on research and development programs

Research and technology development is among the principal measures in obtaining the target in production of energy from renewable energy sources. In 1999, the National Technology Agency TEKES established the five year Wood Energy Technology Program to stimulate the development of efficient systems for large-scale production of forest chips. Key targets were competitive costs, reliable supply and good quality chips. The two guiding principles of the program were:

- close cooperation between researchers and practitioners
- to apply research and development to the practical applications and commercialization.

The program consisted of 35 research projects, 35 industry projects and 15 demonstration projects. The main research areas of the program have been planning and organization of chip production, production systems including logistics, quality control, handling and storage of solid fuels, impacts on forestry, energy production and usage. During the first four years of the five-year program, the use of forest chips increased from 0.5 M m^3 to 1.7 Mm^3. If the official goal of the Action Plan for Renewable Energy Sources is to be achieved, an increase of 400 000 m^3 is required each year of this decade. The program aimed to promote the large-scale forest chips production ended in 2003. In 2002, the program was extended by a new sub-program focusing on small-scale production and combustion of forest chips. This specific activity focuses on solutions for the small-scale wood fuel production (usually under 1 MW), storage, processing and distribution as well as energy production. This specific topic will continue until the end of 2004 (Hakkila,P., 2003).

Resources of biomass for energy

Despite the current utilization of forest residues and other sources of biomass for energy there is still a large potential to further increase the production of forest fuels. Although the forest industries apply efficient technologies, a considerable part of the raw material is unsuitable for end products. Only 53.5 % of the overall amount of processed wood ends up in industrial products. The rest 46.5 % is being used for energy production. In 2002 the following amounts of wood residues were used for production of energy (Hakkila 2003):

- black liquor - 17.7 million m^3
- bark - 8.0 million m^3

- sawdust - 3.1 million m^3
- recycled wood - 0.2 million m^3
- pellets, briquettes - 0.05 million m^3
- traditional firewood - 5.8 million m^3
- forest chips - 1.7 million m^3

In addition to those amounts there is still a high potential of unutilized forest residues. The theoretical potential of biomass for energy use is 45 million m^3/a. Depending on the criteria employed, the technically harvestable biomass reserve is estimated to be 10 – 16 million m^3/a, or 22 - 35 % of the theoretical potential. The goal of the Action Plan is to utilize 5 million m^3/a in 2010.

The technically harvestable potential of forest fuels consist of logging residues from final harvest (18.1 TWh), small diameter wood from precommercial thinnings (2.3 TWh), residues and small wood from commercial thinnings (9.6 TWh), stumps and roots from final fellings (3.0 TWh) and wood from unproductive hardwood stands (1.6 TWh). Because forests fuels are scattered over a large geographic area, the radius of the procurement district can be very large. The radius of the procurement district around the plant is defined by the annual use of forest fuels at the plant and the annual harvestable amount of forest fuels in the surrounding of the plant. The harvestable amount is dependant on the fuel mix that the plant can use. When the plant can use chips made of all types of forest fuels, the procurement district becomes considerably smaller. For instance the average availability of small wood from early thinnings was estimated to be 10 m^3/km^2/a, stumps and roots 30 m^3/km^2/a and logging residues 40 m^3/km^2/a at the surroundings of Joensuu central heating plant (Asikainen, A., 2003).

Technologies for large-scale chip production

Research on the large technology programs has been an important tool to eliminate the bottlenecks in biomass utilization for energy (Röser, D. et al, 2003). Four alternative production systems have been studied in the Wood Energy Technology Program, taking into account the efficiency of the whole chain from biomass collection, chipping, storing, handling and transport. Also the impact of different production systems and the removal of biomass on the forest ecosystems have been studied. The four developed systems are as follow:

- Chipping in the stand – requires a highly mobile chipper suitable for operations in terrain, equipped with 10 -20 m^3 container. When large volumes of forest fuels are produced, the terrain chipping system becomes difficult to control. At present, the role of the system is diminishing.
- Comminution at landing – the system is performed in smaller operations with farm tractor-driven chippers and in large-scale operations primarily with heavy truck-mounted chippers or crushers. Chips are blown up from chippers directly into high capacity trailer truck, which make the system very vulnerable, when subsequent machines are dependent on each other. The system has so far kept its position as the basic solution for large-scale procurement of chips.
- Comminution at a terminal or plant – the biomass is transported to the plant in the form of undelimbed tree sections, whole small trees, loose logging residues or stumps and roots. Low bulk density restricts the operation radius, unless the biomass is bundled. At large plants the comminution can be

performed by efficient stationary crushers at low costs. For stumps and roots it is the only feasible alternative. At smaller plants, the use of mobile chippers or crushers is more feasible.

- Bundling of logging residues – this system has been one of the key areas of technological development. Logging residues are compressed and tied into 60 – 70 cm diameter and 3 m long bundles. A bundle of green residues weights 500 kg and has an energy content of about 1 MWh (Hakkila, 2003). Bundles are transported to the road side by a conventional forwarder and on to the plant using conventional timber truck. One truck load consists of approximately 65 bundles or 30 tons. Transport costs are reduced significantly by bundling forest residues, which is very important in the case of large capacity heating plants where long distance transport of biomass is needed. Bundles are crushed by stationary equipment at the plant.

Promotion of bioenergy by strengthening the regional cooperation

Forests, peatlands, lakes and rivers are the most important natural sources of renewable energy and biofuels. Hundreds of modern bioenergy power and heating plants and technologies from farm size up to large forest industry plants and CHP-systems have been installed. Biofuels are being used all over the country, however, the highest consumption is in Central and Eastern Finland. Due to the low energy density and high cost of transport, biomass fuel markets are usually local or regional. One of the regions where wood energy is used extensively is North Karelia. North Karelia abounds in unused wood energy resources. It also benefits very much from the concentration of many institutions dealing with biomass utilization for energy. The Joensuu Regional Development Company JOSEK Ltd. has launch a program to promote biofuel utilization by establishing „The North-Karelian Wood Energy Cluster“. The Wood Energy Cluster consists of more than 30 organizations involved in education, research and development, consulting companies, forest organizations, wood harvesting companies, producers of machines and equipments for forest operations and heat production, producers of biofuels as well as producers and deliverers of heat and power.
The aim of the cluster is to develop and implement large technology transfer programs by elaborating feasibility studies, pilot projects, know-how transfer by education and research. Technology transfer is based on practical implementation of projects with approved technological chains in compatible conditions. The existing energy plants, supply chains and business models from farm size to large CHP plants together with an exceptional concentration of manufacturers of wood energy technology combine to make up the Karelian Wood Energy Network – a live model for maximising the use of local bioenergy resources.
Recently a project for regional cooperation dealing with biomass utilization for energy between the North Karelia region, Finland and the Banska Bystrica region in Slovakia is under preparation. We cordially invite all partners interested to join us in the preparation and successful implementation of the project.

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VYUŽITIE BIOMASY NA VYKUROVANIE OBECNÝCH BUDOV V OKOLÍ BANSKEJ BYSTRICE

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Resumé

V článku sa uvádza projekt vykurovania obecných budov biomasou v deviatich obciach v oblasti Banskej Bystrice. Spracovaná je kvantifikácia zdrojov energeticky zužitkovateľného dreva v oblasti - ťažbových zvyškov, odpadov z drevospracujúcich prevádzok a sortimentov dreva nižšej kvality. Uvedený je návrh technológie zásobovania palivom, prehľad kotolní a vykurovaných objektov a ekonomické hodnotenie projektu.

Úvod

Slovensko patrí k najlesnatejším krajinám na svete. 41 % územia pokrývajú lesné porasty a ročne sa ťaží cca 6 miliónov m^3 dreva. Z toho vyplýva, že biomasa patrí na Slovensku k najvýznamnejším obnoviteľným zdrojom energie a najmä na miestej a regionálnej úrovni môže čiastočne znížiť závislosť od dovozu palív a energie. Napriek tomu využívanie biomasy na výrobu energie v moderných spaľovacích zariadeniach je u nás ešte málo rozšírené. Na výrobu tepla z biomasy pri inštalovaných výkonoch nad 100 kW sa v súčasnosti používajú spaľovacie zariadenia s automatickým režimom, konštruované na palivá v sypkej forme ako sú štiepky, piliny alebo pelety s účinosťou spaľovania vyše 85 %.
Projekt využitia biomasy na vykurovanie obecných budov v okolí Banskej Bystrice iniciovali Občianske združenia CEPA (Centrum pre podporu miestneho aktivizmu), Eliáš a Hrochoť. V súčasnosti je doňho zapojených deväť obcí: Hiadeľ, Hrochoť, Kordíky, Králiky, Ľubietová, Môlča, Poniky, Riečka a Tajov. Projekt vychádza z predpokladu, že v okolí Banskej Bystrice, vzhľadom na vysokú lesnatosť a početné drevospracujúce prevádzky bude dostatok lacného odpadového dreva vhodného na energetické zužitkovanie, a že rekonštrukciou kotolní, v ktorých sa v súčasnosti používajú fosilné palivá sa znížia náklady na kúrenie a významne sa zníži aj produkcia nežiadúcich emisií.

Uvažované kotolne sú vo veľmi zlom stave a vo všetkých bude v krátkom čase potrebná rekonštrukcia. Vzhľadom na to, že ani jedna z obcí zapojených do projektu nie je plynofikovaná, do úvahy prichádza len rekonštrukcia so zachovaním pôvodného paliva – uhlia, alebo rekonštrukcia so zmenou paliva na biomasu.

Zdroje drevného paliva

Z technologického a ekonomického hľadiska možno na energetické využitie kalkulovať najmä s odpadmi vznikajúcimi v procese ťažby a manipulácie v lese, odpadmi zo spracovania guľatiny v drevospracujúcich prevádzkach a menejkvalitnými sortimentami dreva.

Ťažbové zvyšky

Na energetické využitie možno z lesnej ťažby uvažovať s menejhodnotnou, tradičnými technológiami nezúžitkovateľnou hmotou, ktorá sa doteraz vôbec nespracúvala a väčšinou sa po poťažbovej úprave pracovísk bez úžitku spaľuje priamo na rúbanisku. Je to hmota tenčiny stromov do 7 cm, odpadová hrubina stromov a biomasa z prerezávok. Celkový ročný využiteľný potenciál ťažbových zvyškov z okolitých lesov je 3250 t. Z listnatej ťažby napadne 2190 t, z toho v štátnych lesoch 1520 t a v neštátnych 670 t; z ihličnatej 1060 t, z toho v štátnych lesoch 740 t a v neštátnych 450 t.

Odpady z drevospracujúcich prevádzok

Významým zdrojom energeticky zužitkovateľného dreva sú odpady z drevospracujúcich prevádzok. Výťažnosť pri poreze guľatiny je priemerne 60 až 65 % a zvyšok tvoria odpady, z ktorých cca 65 % tvoria odrezky a 35 % piliny. V prípade, že sa na píle rezivo aj ďalej spracováva napr. na hranolky, vznikajú ďaľšie odpady a potom ich celkový podiel tvorí až do 70% zo spracovávanej guľatiny. V okolitých drevospracujúcich prevádzkach vzniká ročne 38210 t drevných odpadov z toho 24940 t odrezkov a 13270 t pilín.

Sortimenty dreva nižšej kvality

Okrem uvedeného tzv. odpadového dreva možno na energetické zužitkovanie z hľadiska ceny uvažovať aj zo sortimentami dreva nižšej kvality, najmä s vlákninovým drevom. Jedná sa predovšetkým o drevo z výchovných ťažieb. V prípade použitia stromovej metódy ťažby a štiepkovania celých stromov na odvozných miestach bude cena takéhoto dreva v porovnaní s bežnou vlákninou nižšia o náklady na manipuláciu. Spracovaním celých stromov sa zvýši celkový objem ťažby o hmotu nehrúbia a znížia sa náklady na uhadzovanie haluziny spojené s poťažbovou úpravou pracovísk, čo bude mať následne vplyv na zníženie ceny dreva na odvoznom mieste. V lesoch v okolí Banskej Bystrice sa ročne vyťaží vyše 8500 m^3 vlákninového dreva.

Súhrn zdrojov paliva

Celkom je v okolí Banskej Bystrice ročne potenciálne k dispozícii na energetické účely 49960 ton odpadového a menejhodnotného dreva. Najväčšiu časť z toho, 76,5 % tvoria odpady na pílach, 17 % vlákninové drevo a 6,5 % ťažbové zvyšky. Podľa energetických auditov spotreba paliva v plánovaných kotolniach bude spolu okolo 2000 ton ročne. Z porovnania potrieb a možností vyplýva, že uvedené zdroje predstavujú dostatočnú zásobu na vykurovanie navrhovaných kotolní aj po zohľadnení rizík spojených napríklad s možnosťou ukončenia činosti na niektorej z uvedených píl.

Príprava a skladovanie paliva

Návrh zásobovania jednotlivých kotolní palivom je založený na využití drevných surovín najmä z obcí zapojených do projektu a zdrojov z blízkeho okolia. Alternatívne sa uvažuje s kúrením štiepkami alebo zmesou štiepok a pilín. Zmes štiepok a pilín, vzhľadom na nízku cenu pilín je lacnejšia ako samotné štiepky, ale nevýhodou môže byť vlhkosť. Pri skladovaní je potrebné hromady pilín častejšie prehadzovať nakladačom aby sa vlhkosť znižovala.
Z kalkulácií nákladov na prípravu paliva vyplýva, že najlacnejšie a zároveň najdostupnejšie sú odpady z obecných píl v Ľubietovej a Ponikách. Tu sa bude palivo pripravovať a skladovať. Po prepočte na 35 % vlhkosť, s ktorou sa uvažuje pre spaľovanie v kotolniach je na týchto dvoch pílach ročne disponibilných 1360 t štiepok (z toho 400 t v odrezkoch) a 800 t pilín. Celkom je to 2160 t biomasy čo plne pokrýva spotrebu všetkých navrhovaných kotolní.
V prípade nedostatku suroviny možno chýbajúce množstvo zabezpečiť z ďalších okolitých píl. Napríklad na pílach v neďalekej Slovenskej Ľupči vzniká ročne po prepočte na 35 % vlhkosť cca 2340 t odrezkov a 1140 t pilín.
Náklady na prípravu a skladovanie paliva (tab. 1) zahrňujú cenu suroviny prepočítanú na 35 % vlhkosť, náklady na štiepkovanie, nakladanie, dopravu, prehadzovanie kôp a skladovanie.

Píla	Štiepky ($Sk.t^{-1}$)	štiepky + piliny ($Sk.t^{-1}$)
Ľubietová	656	599
Poniky	737	448

Náklady na prípravu a skladovanie paliva
Tabuľka 1

Náklady na výrobu tepla

V tabuľke 2 sú uvedené investičné náklady na rekonštrukciu kotolní zapojených do projektu a náklady na výrobu tepla. Vzhľadom na vývoj situácie v oblasti energetiky a aj v súvislosti so vstupom Slovenska do EU, možno reálne predpokladať, že sa na realizáciu projektu podarí zabezpečiť dotácie z domácich zdrojov a z fondov EU na značnú časť investičných prostriedkov, čo významne zníži náklady na výrobu tepla. Z toho dôvodu boli ročné náklady počítané aj pre alternatívu finančného krytia dotáciami vo výške 10 až 100 % z celkovej výšky investície.
Z údajov uvedených v tabuľke 2 vyplýva, že priemerné náklady na výrobu tepla za celý projekt sú nižšie ako je aktuálna cena tepla na Slovensku stanovená Úradom pre reguláciu sieťových odvetí aj pri najnepriaznivejšej alternatíve (bez dotácií a pri spaľovaní štiepok bez pilín).

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