The Oil Drum
DISCUSSIONS ABOUT ENERGY AND OUR FUTURE

On burning wood, coppicing and pollarding

Posted by Heading Out on September 4, 2009 - 10:15am
Topic: Alternative energy
Tags: coppicing, firewood, pollarding, wood pellets, wood stoves [list all tags]

The power plant on our campus is set up so that it can burn either coal, natural gas or wood feed stocks. At the present time the natural gas lines are blocked, since the trends of increasing price made it uneconomic to use within the boilers. However the plant uses around wood for 40% of the feed, and has for a number of years. It helps, both with pollution control, and with the overall plant economics (oftimes being cheaper per kwh generated). We are located adjacent to a national forest and thus there is a ready supply of material.

This practice is beginning to catch on, as Bloomberg notes:

> Using biomass for power and heat -- mainly from poplar, willow and pine trees -- grew by 25 percent during the past two decades, according to the International Energy Agency, the Paris-based adviser to 28 oil-consuming nations such as the U.S.
>
> Industrialized nations got 4 percent of their energy from biomass in 2006, the most recent data available from the IEA. That was the equivalent of 151 million tons of oil.
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> Chips of wood stumps and branches, heated to 400 degrees Celsius (750 degrees Fahrenheit) at the Novus furnace, are as efficient as coal and cheaper: European Union rules don't require carbon-dioxide permits because the trees absorbed a like amount of the gas before harvest, making them carbon-neutral.

Now in relatively small quantities this is a viable program, and for domestic heating wood has long been a fall-back supply (we buy several cords each winter to burn in our tile stove).

It is particularly useful as a supply in those parts of the country where solar and wind energies are not going to be locally available as viable resources (long-term, long-distance transmission of generated power is an issue I'll duck today).

However, before everyone rushes out to get a stove, furnace, or even a fireplace it is worth reminding folks of some historic facts (some of which Bloomberg also catches).

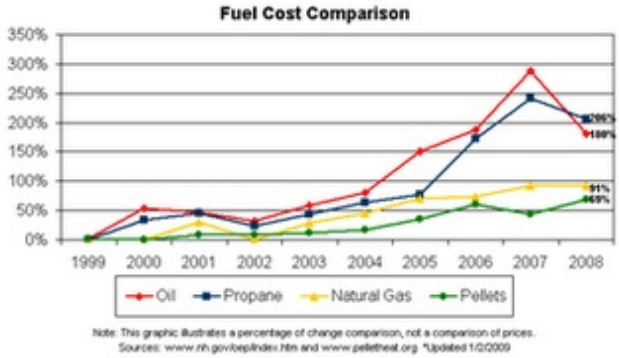
Generally you burn up a tree a whole lot faster than you can grow a new one. Out of that reality grew the European practice of coppicing where the young limbs of the tree are harvested back to just above the stump, and the stump thenn allowed to regrow limbs. (The practice dates back to before Henry VIII.) Trees such as birch may, for example, be harvested every three or four years, while the basic root of the tree may survive for centuries.

Coppiced trees. (Source Hampshire County Council)

The alternative practice is known as pollarding where the tree is first allowed to grow to some height, and then the limbs are cut back. Because the growth then occurs at a later stage in the tree life, the trees will mature in a way that coppiced trees won't though the production can come faster. It is used where livestock could come in and eat the coppiced limbs (Henry VIII passed laws about fencing the coppiced plantations, thereby enclosing parts of the forest). Both practices were common in Europe with their need for fuel and fencing material, oak and willow being commonly harvested this way, and the characteristic tree shapes are a feature of landscape portraits by artists such as Gainsborough, Knight and Price. It is a practice that, though laudatory for many reasons, has fallen into abeyance, since it is, among other things, very labor intensive. It is suggested that less than 3% of modern woodland is coppiced. There are some attempts to regenerate the industry.

Pollarded Trees (source Wikipedia)

Short of these land management and wood harvesting techniques, wood can only be expected to supply a limited amount of fuel before it too runs out. Pelletizing the waste products from wood manufacture has created an industry that can, again, supply a limited market with fuel. Until recently the price has been relatively stable in comparison with other fuels.



Relative wood pellet cost (source New England Wood Pellet LLC)

An average household is anticipated to use some 2.67 tons of pellets a heating season, and they have advantages of being cleaner and simpler to operate than the wood that heats me at least three times (stacking, moving and burning).

Were the whole nation to turn to wood, however, then as happened in Europe in previous times, the cost of the fuel could well skyrocket. I have mentioned in earlier posts that King Edward I (Longshanks) tried to ban the burning of coal back around 1306, but the costs for wood were so much higher, that the ban was ineffectual, as were subsequent bans by monarchs such as Elizabeth 1. And even today one finds that there are those who would rather burn coal than wood. The stove that we have can be adapted (using two grates in about 2 minutes) to burn coal, however, as yet we have not examined that option.

The Bloomberg article notes that one supplier of pellets has already sold this year's supply, and with 800,000 households (I suspect many, like us in more rural parts of the country) already using wood, overall supplies may also become tighter. And, in Europe RWE is building wood-fired power plants, and eighteen months ago a large-scale plant opened on Teeside in the UK.

This 30 MWe plant uses 300.000 tons of woodchips a year.

> The wood for the station comes from four separate sources. Around 40% of the 300,000t a year total is recycled wood from UK Wood Recycling. This is received, stored and chipped on a nearby, separately owned site at Wilton. A further 20% comes to the site already chipped as offcuts from sawmills. SembCorp is working with the Forestry Commission to bring another 20% from north east forests in the form of small roundwood logs – items sometimes left on the forest floor after routine tree felling operations.
>
> Finally, 20% comprises specially grown energy crops in the form of short rotation coppice willow. The company Greenergy is supplying the wood, to be grown by farmers and other landowners within a 50-mile radius of the site.
>
> The new plant required the growth of around 7,500 acres of coppice in the area, an activity that is creating local wildlife havens.

As an example of the benefits available to local farmers is the case of the Corrigans near Middlesborough and the power plant. They have three 25 acre willow plantations, the first of which has just come to first harvest. Once dried it will be shipped to Wilton and bring in around $20,000. As the plants mature this harvest is expected to increase. There are other advantages

> He said: "There has been a dramatic increase in insect and bird life especially snipe, woodcock, lapwings and reed bunting as well as pipistrelle and long eared bats and three species of owl.

So we have found a couple more words that you should probably add to your energy lexicon. And

they provide not only fuel, but also jobs.