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Forget deforestation... think reforestation

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WHEN IT COMES to finding new ways to create energy, there's an assumption that the solution must come from something new. In Austria, however, experts are showing that this is not necessarily the case. Particularly when it comes to something as elementary as burning wood – which is as old as the proverbial hills.

Wood has been used as a heat source for thousands of years, and a power source for more than a century, but the relationship between deforestation and global warming has caused it to be overlooked as a potential alternative source of energy. However, new forestry production and management techniques trialed in Austria suggest that trees might actually have a key role to play in helping to sustainably satisfy our demand for energy – the key is being smart about how we do it.

Forget deforestation... think reforestation

With forests covering almost half the country – 47 per cent in fact – you don't have to go far to find a tree in Austria. So, it's unsurprising that the nation would look to harness this natural resource for its energy needs. But, sustainable forestry is more complicated than just cutting down one tree and replacing it with another. Some clever thinking is required.

"A forest owner has to determine the total volume of growth in their forest per year, every ten years," says Christian Rakos of the European Pellet Council. "If 1,000 cubic metres of wood are added every year by growth of the trees, this is the volume you can cut each year." Formulas such as this have helped shaped laws that govern the progressive forestry industry in Austria. The math might be a little tricky, but in Austria, any deviation from this formula is taken very seriously indeed – so much so that there are special authorities who ensure that forestry laws are respected. What's more, these forest police must approve any cutting that's larger than half a hectare, and check regularly to ensure that harvested areas are replanted immediately, or will naturally regenerate within five years.

Similarly, endangered species are also carefully monitored, and forestry near their habitats severely restricted. If the worst should happen and a forest is wiped out unexpectedly by natural disaster, say from a storm, disease or pests, then the number of harvestable trees the following year will be reduced accordingly. They might be strict, but these tactics are certainly working. After all, forty percent of Austria's annual forest growth remains untouched each year, with the net result being that forests are actually increasing in size.

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Waste not, want not

Regulations around replanting are just one aspect of Austria's sustainable forestry practices. Once a tree has been chopped down, the process of using every part of it follows the principle of cascading, with the most valuable part of the tree – the trunk – converted into timber products, usually for construction or furniture.

Non-trunk wood is processed into cross laminated timber (CLT); currently the most advanced sustainable building material there is, as studies have shown that its use actually reduces carbon dioxide levels in the atmosphere throughout the lifetime of the building it's part of.

In time CLT could reduce the building industry's reliance on steel, concrete and even plastic, all of which release huge amounts of carbon during production. At the end of this cascade, you'll find tree bark and sawdust, which were traditionally discarded as waste products, at best ending up on the floor of children's playgrounds. Now, however, these bio-products are being converted into wood pellets and used as an alternative and somewhat sustainable, heating source. Even if fossil fuels are used in making and transporting the wood pellets, the carbon dioxide reduction is 74% per cent when compared to using coal as a power source.

Natalie Binder, whose family business is Binderholz, a sawmill and biomass generation facility in the west of the country less than an hour from Innsbruck, points out that there are further sustainability benefits to using biomass in this way. At their plant, they even re-use some of the green electricity that they generate – creating a virtuous energy circle : “The waste tree bark is thermally converted into eco-electricity and heat, for drying the sawdust we use for pellet production.” The majority of the eco-electricity generated at Binderholz is fed into the public utility grid, supporting 12,000 local homes and providing hot water to an entire village nearby. It hasn't taken long for this idea to catch on; there are now 42 wood pellet plants operating in the same way across the country, plus bioenergy 2020+, the world's largest bioenergy research centre, is based in Austria.

Burning Brightly

Wood pellets release very few other emissions. For example, a wood pellet central heating boiler for a large family emits just 1kg of ash per year, in the form of fine particles – which is very little when you consider Austria's total fine dust emissions are around 50,000 tons a year. To put this into context, replacing an old wood or coal-fired boiler with a pellet-burning equivalent can reduce emissions by around 90 per cent . Another advantage of this technology is that pellet boilers are known for their easy operation and cleanliness. It's something that's driving their increasing popularity not only in Austria, but right across Germany, Italy, France, and the UK.

What does the future hold?

While this is all very well, the key to really making wood part of the solution relies on rolling out these practices globally. The good news is that it is happening and can be adapted to geographic needs. In Uganda, for example, where forest cover has declined due to charcoal and firewood use, stove manufacturer Awamu is designing a pellet cookstove that uses rice-husk pellets instead of bark and sawdust – but still using the same eco-friendly processes. With a bit of luck, and some investment,



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sustainable, clean cooking in Africa may soon become the norm . Similarly, in China – where pollution problems have been caused by a reliance on coal – Chinese researchers are now talking to Austrian experts about building a pilot pellet plant powered by waste straw, set for completion at the end of 2019.

While there are still many challenges surrounding the solutions we're exploring in our bid to sate our relentless appetite for energy, it's encouraging to see alternative forms of fuel in the market, especially if they can be made sustainable.

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