

# Misguided strategy

Burning Wood to Mitigate  
Climate Change



# Biomass boom puts pressure on forests

Almost everywhere in the world the pressure on existing forested areas is steadily rising. The reasons are manifold. In many parts of the world, growing wood demand puts increasing pressure on forests and logging exceeds the limits

of ecological resilience. Forests are also converted to agricultural land or cut down for infrastructure or mining projects.

A significant portion of the global timber harvest ends up as pulp to supply the paper industry. A look at the plans for further expansion of the global pulp

and paper production suggests that this industry alone will need additional millions of cubic metres of wood in the future. As a result, species-rich forest ecosystems are further degraded into industrial tree monocultures or entire areas are clear cut.

Timber port in Vladivostok



*Since time immemorial, wood has been an important raw material and a source of energy. As long as the use of wood is ecologically sustainable and socially equitable, forests can continue to fulfil their role as a global “air-conditioning system”, as a home for biodiversity and a habitat for millions of people.*

*But if we continue to burn woody biomass in power plants on an industrial scale in the name of a misguided strategy to mitigate climate change, the outlook for the forests is bleak.*

## Saving the climate with wood?

Forests are now also being plundered in the name of climate change mitigation. Under the Paris Climate Agreement, almost every country has committed to keeping the global temperature rise to well below 2 degrees Celsius above pre-industrial levels. This target means that fossil fuels need to be completely replaced by renewable energy as soon as possible.

When we talk about renewable energy, most people think of the sun and wind. But they are primarily used to generate electricity. They hardly contribute to heating and transport where biomass is the main source of renewable energy—especially wood. This can have serious consequences for the forests.

The European Union has recently updated its Renewable Energy Directive (RED II). Among other things, it aims to increase the share of renewables to 32% by 2030. This is an ambitious target, as the current European average is only 17%. This will further increase wood consumption in the future. One reason is the EU’s decision to consider the burning of wood as climate neutral. This decision made it possible for the Member States to subsidise the use of woody biomass as a measure to mitigate climate change.

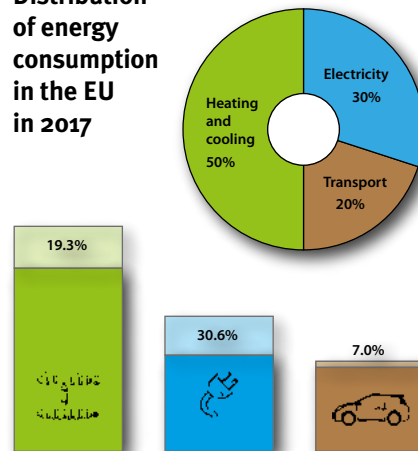
## Wood is the new coal

When asked how they can contribute to climate change mitigation, the operators of coal-fired power plants rarely talk about shutting down their plants as quickly as possible. Instead, coal – a fuel harmful to the climate – will be replaced by wood, which is supposedly climate friendly.

Without any major modifications to the existing plants, 10% of the coal can be replaced by wood. If there is adequate funding to convert the plants as needed, it is possible to completely (100%) switch over to wood, as was done with the biggest coal power plant in the UK.

The energy companies have now dusted off their chainsaws and have set their sights on forests as a source of energy. The competition for wood as a global resource has thus intensified. Buyers working for European electricity producers are travelling from Liberia in Africa to North Carolina in the USA to procure enough wood for their subsidised production of “green electricity”.

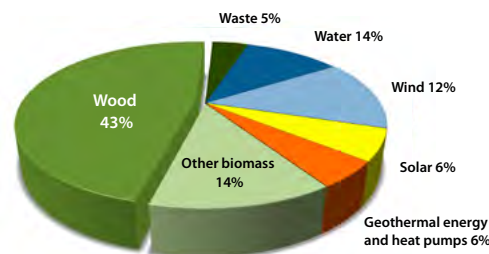
## Distribution of energy consumption in the EU in 2017



Share of renewable energy in the heat, electricity and transport sectors<sup>1</sup>

***In 2017, renewable energy accounted for 17.4% of final energy consumption in the EU.***

***Wood is the biggest contributor.***



<sup>1</sup> EEA (2018): Renewable energy in Europe. Report 20. [www.eea.europa.eu/publications/renewable-energy-in-europe-2018](http://www.eea.europa.eu/publications/renewable-energy-in-europe-2018)

# The role of the electricity companies

The largest wood processing plant in the world is not a chipboard factory for Ikea, but the DRAX power station in Great Britain. Over the last few years, four of their six blocks have been converted from burning coal to 100% biomass. According to research by the international environmental organisation Biofuelwatch, seven million tonnes of wood pellets will be burned

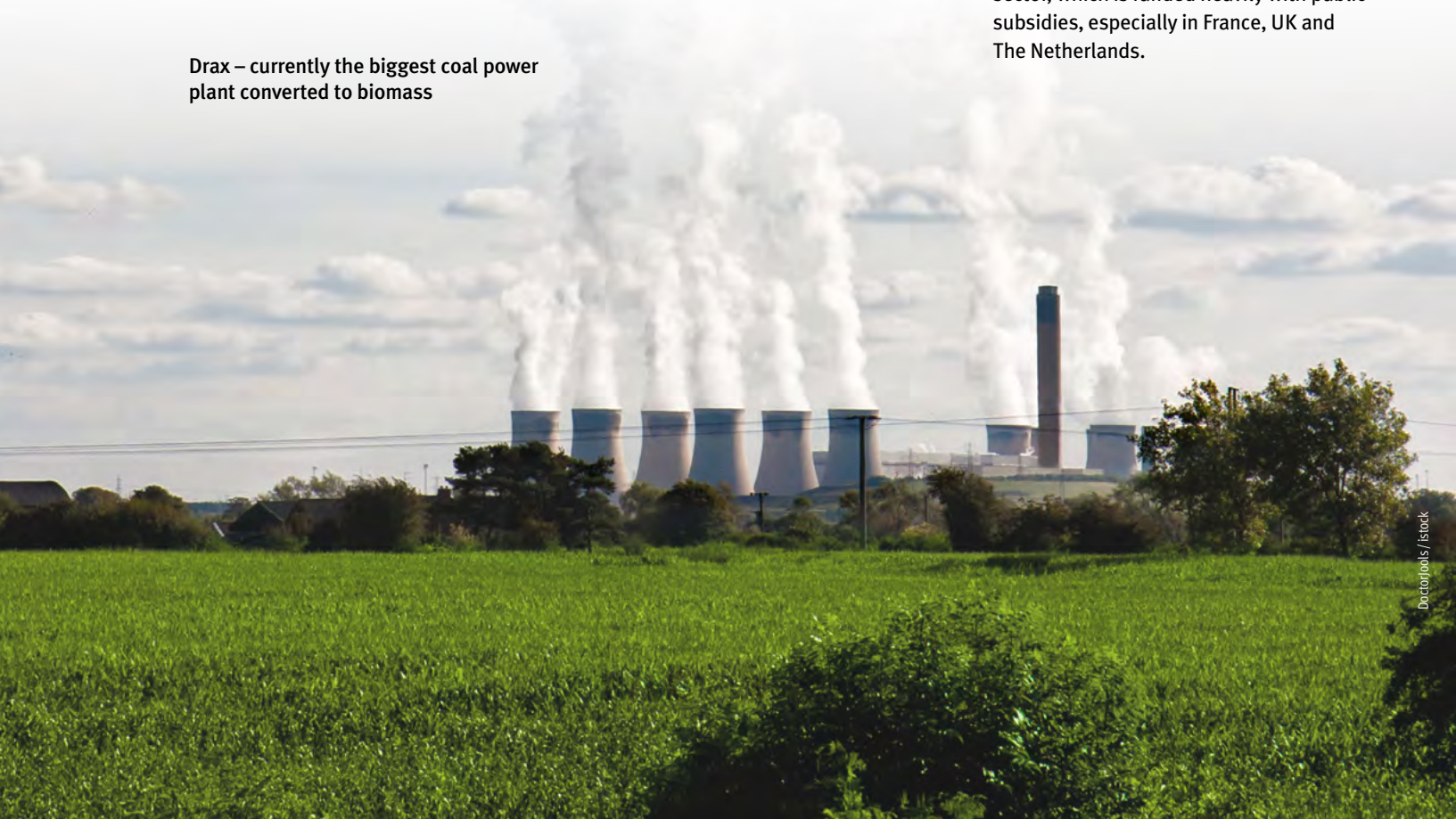
in this plant alone for electricity production in the future. This is roughly equivalent to 21 million cubic metres of timber.

Also in countries like Denmark, Belgium or the Netherlands, the number of wood biomass power plants is on the rise. In the coming years, European demand for pellets alone will increase by a further six million tonnes.

The European Union is one of the most important perpetrators of this misguided development, as it recognises wood burning for electricity production as a climate change mitigation measure. This has made Europe to the most important destination for the international pellet trade.

German electricity corporations are also playing an important role in this sector, which is funded heavily with public subsidies, especially in France, UK and The Netherlands.

**Drax – currently the biggest coal power plant converted to biomass**



**Global demand for woody biomass has increased drastically over the last few years. One key reason: Electricity companies are relying more and more on wood-firing – especially in the form of wood pellets.**

**The global production of pellets alone has increased more than tenfold since the year 2000. The world market is mainly supplied by the USA, Canada and the Baltic States.**

## RWE

is currently converting its coal-fired power plants in the Netherlands. By 2020, the share of woody biomass co-fired at the Geertruidenberg and Eemshaven sites will increase by as much as 80%. This will require more than two million tonnes of wood pellets per year in the future. Environmental organisations like Greenpeace Netherlands are critical of RWE's wood biomass plans as the plants will depend on imported wood from problematic sources such as clear-cuts.<sup>2,3</sup>

## Innogy with Georgia Biomass

Innogy is a spin-off of the RWE energy company and operates what it calls the world's largest wood pellet plant. Situated in the south-east of the United States, Georgia Biomass has an annual production capacity of 750,000 tonnes. According to research by the American nature conservation organisation Dogwood Alliance, the actual harvest practice of clear-cutting may impact unique and endangered forest ecosystems including the Okefenokee Swamp, the largest blackwater swamp in North America.

## Uniper

inherited the coal power plant in Gardanne in southern France from its former parent company E.ON. Block IV has since been converted to 100% biomass. When it is working at full capacity, it will consume more than 800,000 tonnes of wood chips annually.

According to the energy company, half of the fuel is procured from regional forests within a radius of 400 kilometres. The rest of the wood needed will be imported from Brazil and the Iberian Peninsula, mainly from industrial timber plantations.

Over the next 20 years, the French government will provide subsidies of EUR 1.4 billion for burning biomass in Gardanne as a climate change mitigation measure.

Uniper's plans have been met with fierce resistance from the environmentalists at SOS Forêt du Sud. They fear, among other things, that regional forests like the southern French Cevennes are at risk and that the imported timber will come from destructive forestry practices.

In addition, Uniper's 1.1 GW Maasvlakte coal power plant near the port of Rotterdam in the Netherlands will be converted to 30% co-firing in 2019. This will further increase demand for wood pellets.

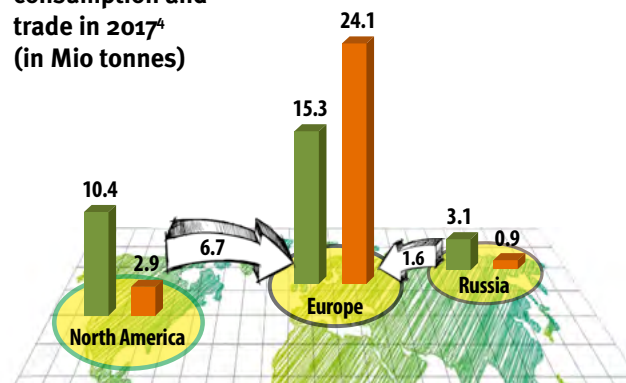
Burning wood for electricity production is a dead end, but energy companies continue to sell it to us as the best solution.

<sup>2</sup> Simard, D.G., Fyles, J.W., Paré, D., Nguyen, T., 2001. Impacts of clearcut harvesting and wildfire on soil nutrient status in the Quebec boreal forest. *Can. J. Soil Sci.* 81, 229–237.

<sup>3</sup> Thiffault, E., Hannam, K.D., Paré, D., Titus, B.D., Hazlett, P.W., Maynard, D.G., Brais, S., 2011. Effects of forest biomass harvesting on soil productivity in boreal and temperate forests – A review. *Environ. Rev.* 19, 278–309. doi:10.1139/a11-009

<sup>4</sup> Bioenergy Europe (2018): Statistical Report, Edition 2018. <https://bioenergyeurope.org/statistical-report-2018/>

## Pellet production, consumption and trade in 2017\* (in Mio tonnes)



■ Pellet production  
■ Pellet consumption

90% of all wood pellets in the world are produced in Europe, the USA, Canada and Russia.

In the last five years, the consumption of pellets in Europe has almost doubled, while exports from North America have almost tripled.

Not only wood residues and sawdust are used to make pellets, but increasingly also logs. The raw materials are crushed and then processed under high pressure in a pellet press. The lignin contained in the wood is liquefied and serves as a binding agent.

# Is the transformation of the energy sector threatening forests in Germany?

Germany's energy consumption can be roughly divided into three equal sectors: electricity, heat and transport. While nearly a third of the total electricity is provided by renewable energy, the figure for heat is just 13%.

So there's still a lot to do in this area – but can it be done sustainably?

## Heat from the forest

In Germany, half of the annual wood supply is used to provide heat. In 2017, almost 10% of German heat consumption was supplied by firewood, pellets, wood chips or wood briquettes.

A large share is accounted for by 15 million private wood stoves and fireplaces, which burn around 34 million m<sup>3</sup> of wood every year. The same amount is used in smaller and larger wood-fired power stations or to make wood briquettes and pellets.

## Salvage logging



*In 2017, wood and wood products supplied almost 10% of Germany's heating energy and 1.5% of its domestic electricity production. Half of the domestic timber resources are already being used for this purpose – and set to increase further.*

*Germany's planned transition to a low-carbon and environmentally friendly energy supply cannot be achieved on the basis of wood. If 20% of Germany's heating needs were met with wood, there would be nothing left over for construction timber, furniture, chipboard or paper. To remind us, the EU has decided to increase the share of renewable energy to 32% by 2030 – and most of it currently comes from woody biomass.*

About a third of this wood comes directly from the forest. Most of it is firewood for private households. In German industrial applications, mainly residues from the timber processing industry, waste wood and residual wood from landscape management are used. The rest of the calculation is simple: If 20% of Germany's heating needs were met with wood, there would be nothing left to produce other wood products.

### On the wrong track

The energy transition, regardless of whether this energy is used for electricity, heat and transport, cannot be achieved on the basis of wood. Although there are continued calls to increase timber harvests in our forests, there is no scope for this from an ecological point of view.

Consequently, forest residues provide little potential for additional use. Until now, treetops and branches have generally stayed in the forest, as they contain most of the nutrients stored in trees. If they are harvested and burned in wood-fired power plants, these nutrients are lost to the forest and subsequent tree growth.

### Burn only after cascading use

In the best-case scenario, wood should be processed into durable products.

The carbon stored in the wood remains sequestered and is not released in the form of CO<sub>2</sub>. If, as a result, energy-intensive materials such as steel or concrete are replaced, this also contributes to climate change mitigation. Ideally, these products are reused and recycled. At the end of their life-cycle, they can ultimately be used to generate energy (i.e. burned).

This kind of cascading use only provides a limited amount of woody biomass which can be used as a source of energy.

### Increasing pellet consumption would harm global forests

Currently, around two million tonnes of pellets are produced in Germany every year, mainly from fully sustainable sources and after cascading use. This is enough to satisfy the current demand of German pellet boilers and small power plants. Additional subsidies for these types of plants only lead to a further increase in demand for fuel from the forest. And this could only be met by imports of pellets, the raw materials of which often come from questionable sources – to repeat it once again: from clear-cuts.

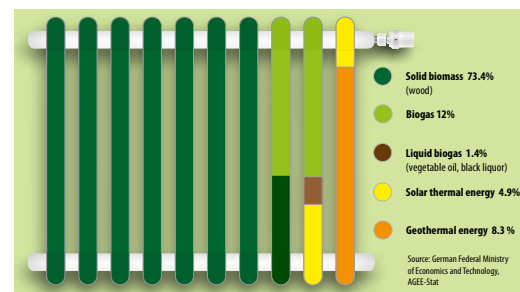
<sup>5</sup> Federal Ministry of Economics, BMWi (2018): Erneuerbare Energien in Zahlen – Nationale und internationale Entwicklung im Jahr 2017

### Forest stocks and timber use in Germany

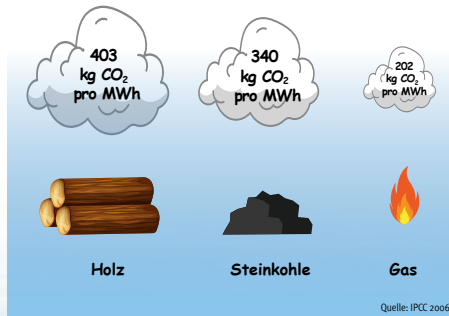


Around 13% of the energy for heat comes from renewable sources. If this share is to be significantly increased in the future, energy sources other than wood are needed. Increasing the harvest would not be ecologically sustainable.

### Heat from renewable energy sources in 2017<sup>5</sup>



# Energy from wood – a contribution to climate change mitigation?



Wood contains less energy than coal, oil or gas. Thus, more of it has to be burned to produce the same amount of energy. According to calculations by the Intergovernmental Panel on Climate Change, heating with wood releases almost twice as much carbon dioxide (CO<sub>2</sub>) as using gas. If a house is heated with wood instead of gas, the amount of greenhouse gases harmful to the climate released into the environment through chimneys increases.<sup>6,7</sup>

Advocates of burning wood don't see this as a problem. They assume that wood, being a regenerative raw material, emits only as much CO<sub>2</sub> during burning as the trees have previously absorbed from the atmosphere during growth. Wood growth (CO<sub>2</sub> sink) and wood burning (CO<sub>2</sub> source) offset one another, which is why they consider wood to be a carbon neutral energy source.

But this does not account for the fact that most tree species take decades to grow back and that they would store additional carbon, if they would not have been cut for burning.



*Woody biomass that can make a significant climate-friendly contribution to energy supply is very limited. This may be wood that was previously used elsewhere and finally ends up as waste wood at a recycling centre, sawmill residues that cannot be further processed into chip-board and similar materials or trees and shrubs that are cut back at roads or in parks.*

*However, these wastes and residues are already being used almost completely in Germany.*

To mitigate climate change we need to reduce carbon emission immediately within the next 20 years. If wood is harvested just to burn it, the carbon dioxide stored in the timber is released into the atmosphere instantaneously. Only over time will this carbon be stored again in the regrowth of forests. Depending on the timeframe, forest management system and climate zone, this can take 25 to 100 years. The use of fresh woody biomass is carbon neutral over time, but not climate neutral. Within the next two important climate-change decades, burning fresh wood will release additional carbon emissions and adversely affect the climate.

### Forests as climate change mitigators

Forests are desperately needed to mitigate climate change. As long as the technical devices that could one day filter CO<sub>2</sub> from the air remain unproven technologies, only forests can provide us with the much needed “negative emissions”. If a tree is not cut down, the carbon contained in the wood remains stored. And as it grows, the tree absorbs additional carbon.

For a long time, it was assumed that young forests have a particularly strong rate of growth and that a balance between CO<sub>2</sub> capture (growth) and release (decay) would be achieved after about 150 years. Today we know that even in very old forests, biomass continues to increase and more CO<sub>2</sub> is stored every year, albeit at a decreasing rate.<sup>8</sup>

In Germany, too, forests could contribute more to climate change mitigation than now. But less wood would need to be harvested – and not more, as is called for by the Federal Ministry of Food and Agriculture in its Charter for Wood.<sup>9</sup>

### ‘Sustainable’ doesn’t always mean ‘climate friendly’

Let’s imagine a family that owns two acres, which is about 1 ha, of forest. About 10 m<sup>2</sup> of wood grow back every year on their land. They harvest the wood and use it to heat their house. This is sustainable (the amount harvested does not exceed the amount of regrowth) and carbon neutral (every year only the amount of carbon that is sequestered in the wood is released during heating).

It’s a nice solution, but it could be even better: burning 10 m<sup>2</sup> of wood produces about 10 tonnes of CO<sub>2</sub>. The energy quantity of 10 m<sup>2</sup> wood is equivalent to that of 3,000 m<sup>2</sup> gas. If it is used to heat the house instead, only 6 tonnes of CO<sub>2</sub> would be released. But the forest continues to grow and sequesters not only this amount of CO<sub>2</sub>, but an additional 4 tonnes.

To assess the CO<sub>2</sub> footprint of a wood-fired power plant, it is not enough to consider the emissions prevented by fossil fuels such as coal, oil or gas. It is also necessary to calculate the additional carbon that is not stored in a forest when more wood is harvested.



In other words: Wood that is not harvested increases the carbon storage of the forest and contributes directly to climate change mitigation. If, on the other hand, it is harvested and burned, it pollutes the atmosphere with more CO<sub>2</sub> than the fossil fuel it replaces.

<sup>6</sup> IPCC (2006): Guidelines for National Greenhouse Gas Inventories. <https://www.ipcc-nggip.iges.or.jp/public/2006gl/>

<sup>7</sup> Brack D. (2017): Woody Biomass for Power and Heat – Impacts on the Global Climate, Chatham House. <https://www.chathamhouse.org/publication/woody-biomass-power-and-heat-impacts-global-climate>

<sup>8</sup> Luysaert S., Schulze E., Börner A. et al. (2008): Old-growth forests as global carbon sinks. *Nature*, 455, 213-215. <https://www.nature.com/articles/nature07276>

<sup>9</sup> Federal Ministry of Food and Agriculture, BMEL (2017): Charter for Wood 2.0. [www.charta-fuer-holz.de](http://www.charta-fuer-holz.de)

# Take action – don't burn our forests for heat!

## The Platform Forest Climate

- informs decision-makers and the general public in Germany and at European level about the dangers of industrial energy production from wood
- brings together partners from environmental and social organisations and develops joint positions
- protests at German energy companies that are involved in wood burning in coal-fired power plants and demands compliance with credible sustainability standards
- calls for an immediate end to subsidies for the industrial burning of biomass
- works closely with partners around the world who support these goals

## Transporting timber by ship in Russia



# The Platform Forest Climate



A project of  denkhausbremen

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Further information can be found at  
[www.plattform-wald-klima.de](http://www.plattform-wald-klima.de)

## Recommendations

- 1) Strict and comprehensive sustainability criteria have to be applied for all pathways of wood use.
- 2) From a climate perspective, bioenergy must deliver genuine, short-term carbon savings compared to fossil fuels. The basis for comparing these savings must be a full life-cycle assessment and transparent carbon accounting that include all relevant factors (e.g. combustion emissions, changes in carbon stocks, indirect land-use change, unexploited sequestration of trees, soil and other vegetation). In practice, this means bioenergy produced from rapidly decaying wastes and residues that are not used by other industries in line with the principle of 'cascading use'.

- 3) We also do not support public funds for coal-to-biomass plant conversions. It is worth noting that conversions of this kind – or the burning of biomass together with coal ('co-firing') – prolongs the life of outdated and inefficient plants, allowing them to continue burning coal for much longer than would have otherwise been possible.

- 4) Bioenergy can play a role in replacing fossil fuels in the European energy mix only if it is used in efficient combined heat and power plants in combination with other renewable sources like wind and solar and based on regional sustainable availability.



