

# Managing sustainability risks of bioenergy in four Nordic countries

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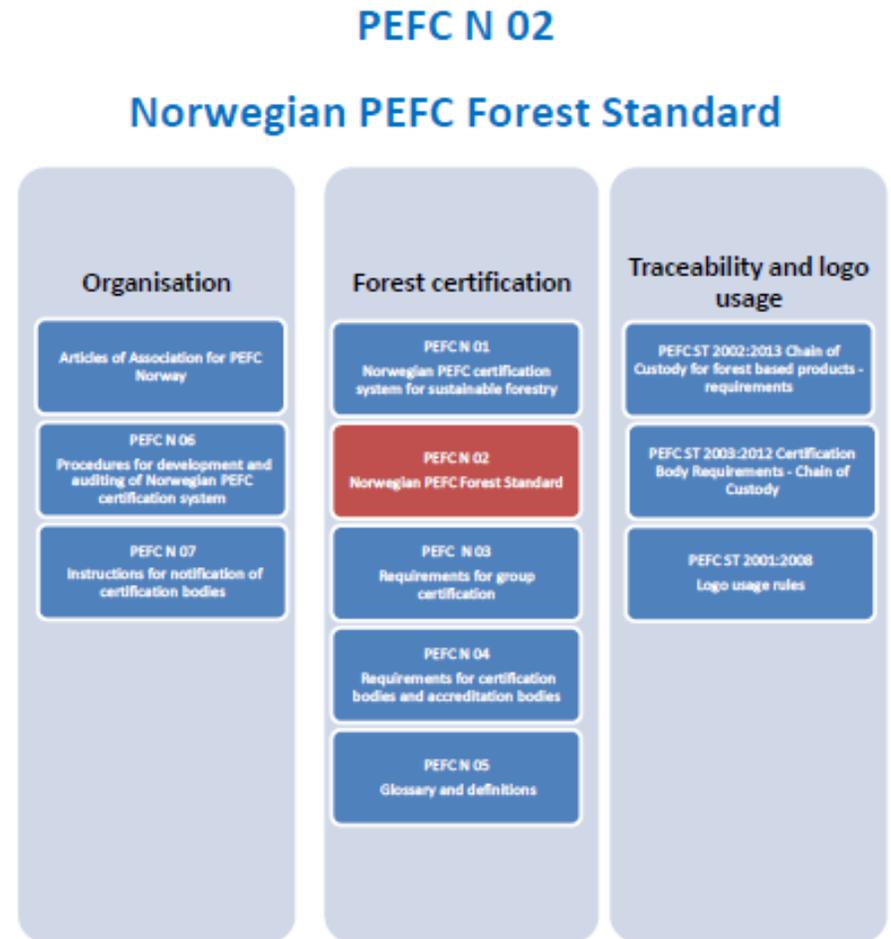
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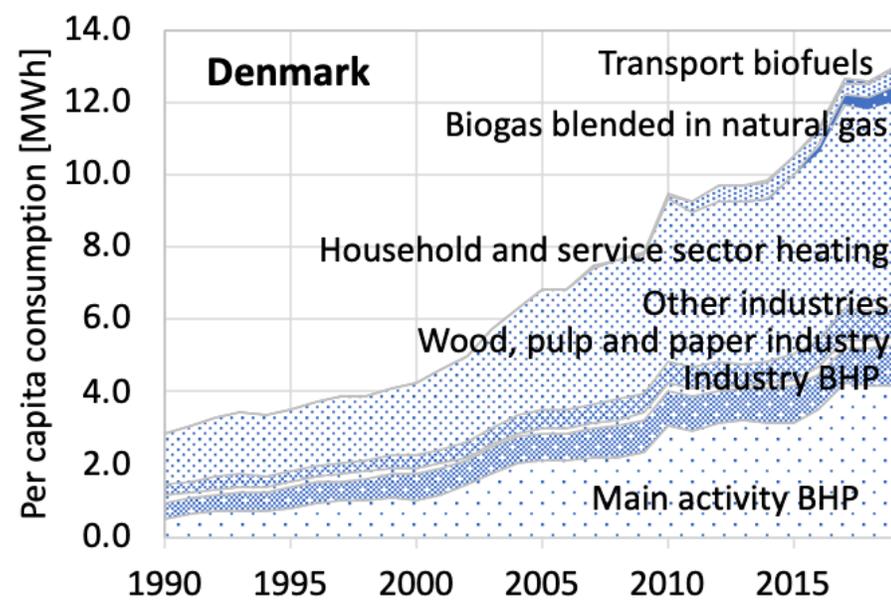
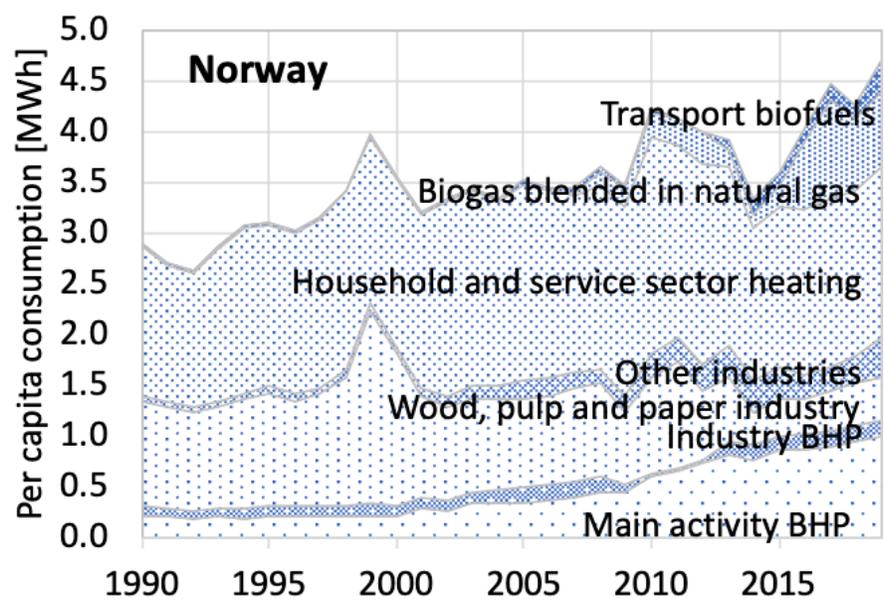
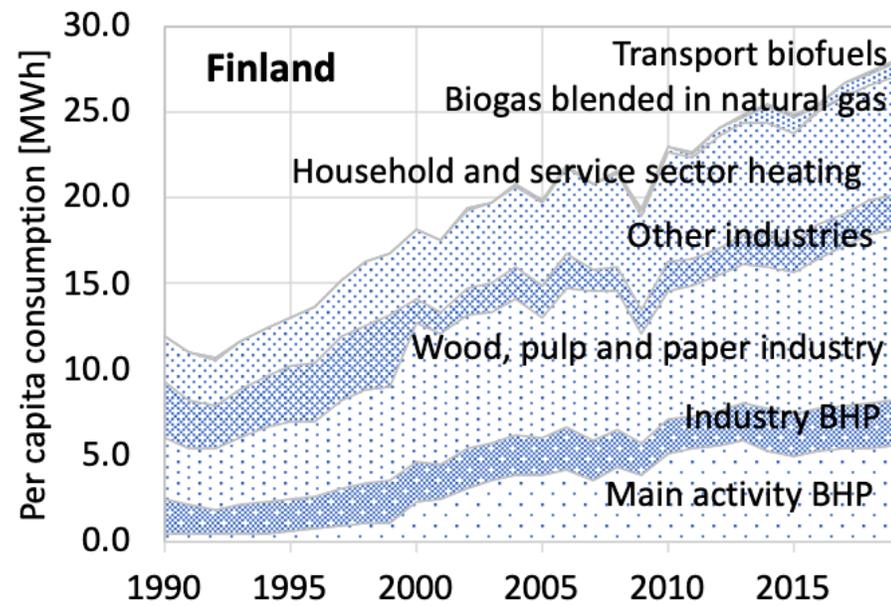
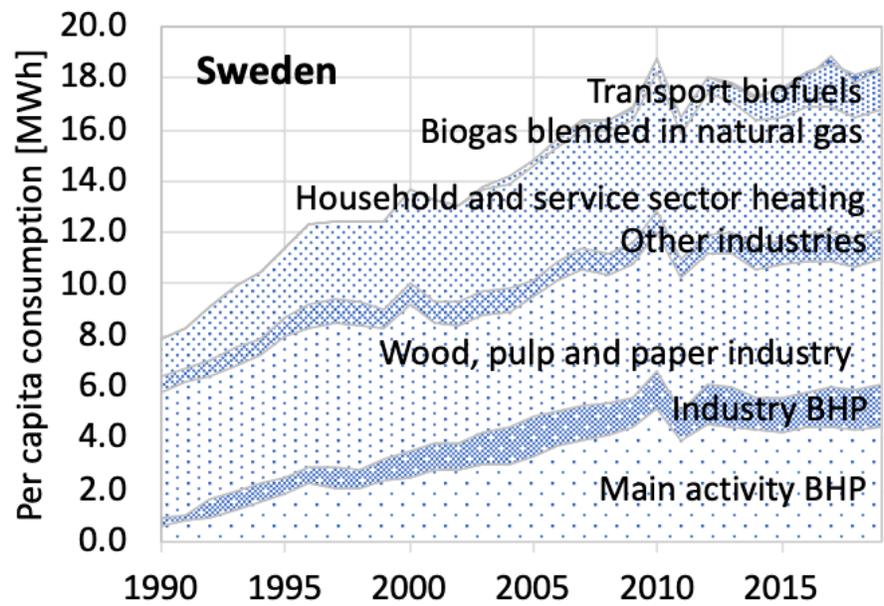
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Bioenergy might play a key role in the transition to a sustainable economy in Europe, but its own sustainability is being questioned.

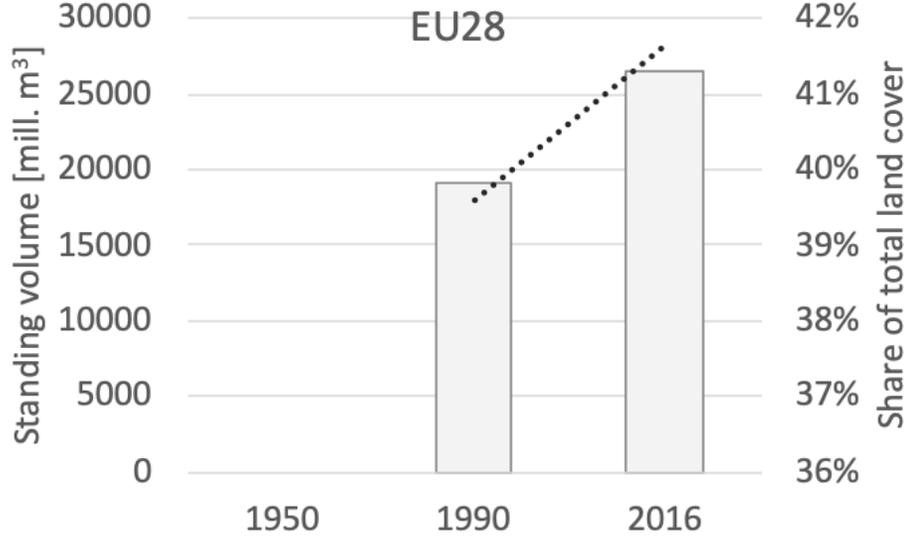
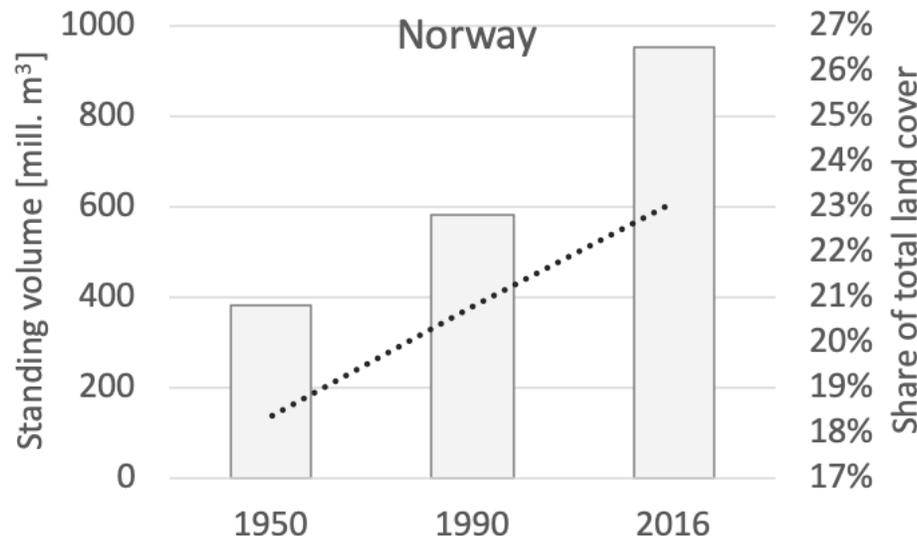
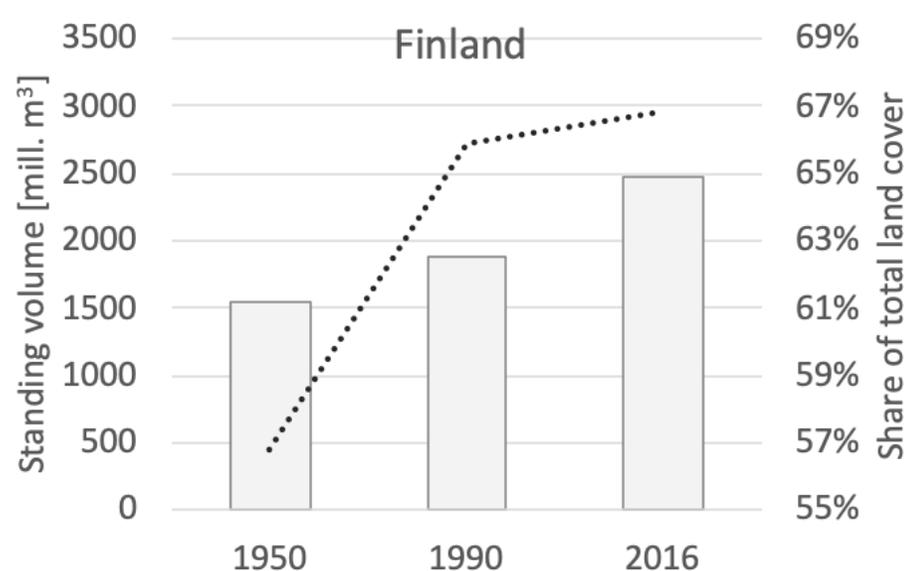
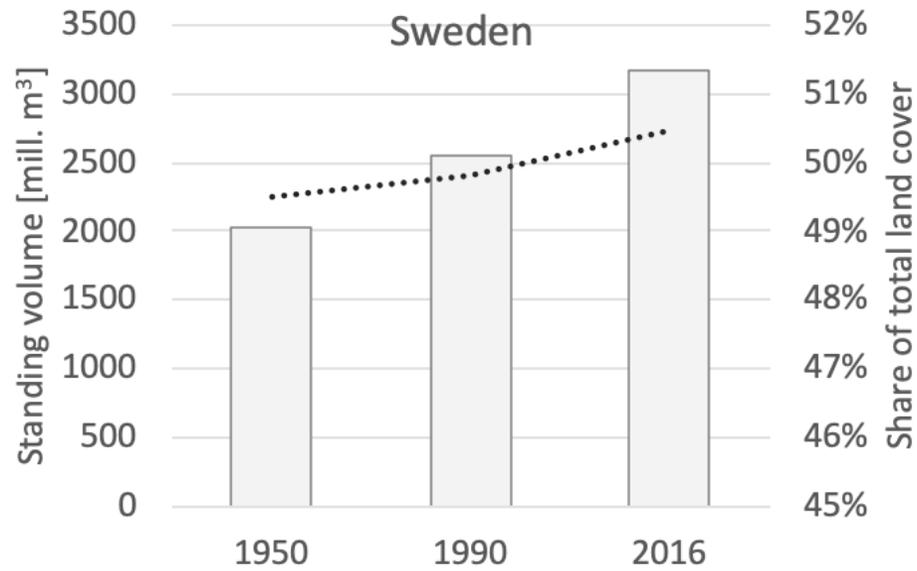
We studied the experiences of Sweden, Finland, Denmark and Norway, to find out whether the forest-based bioenergy chains developed in the four countries have led to unsustainable outcomes and how the countries manage the sustainability risks.

Data were collected from a diversity of sources including interviews, statistical databases, the scientific literature, government planning documents and legislation.





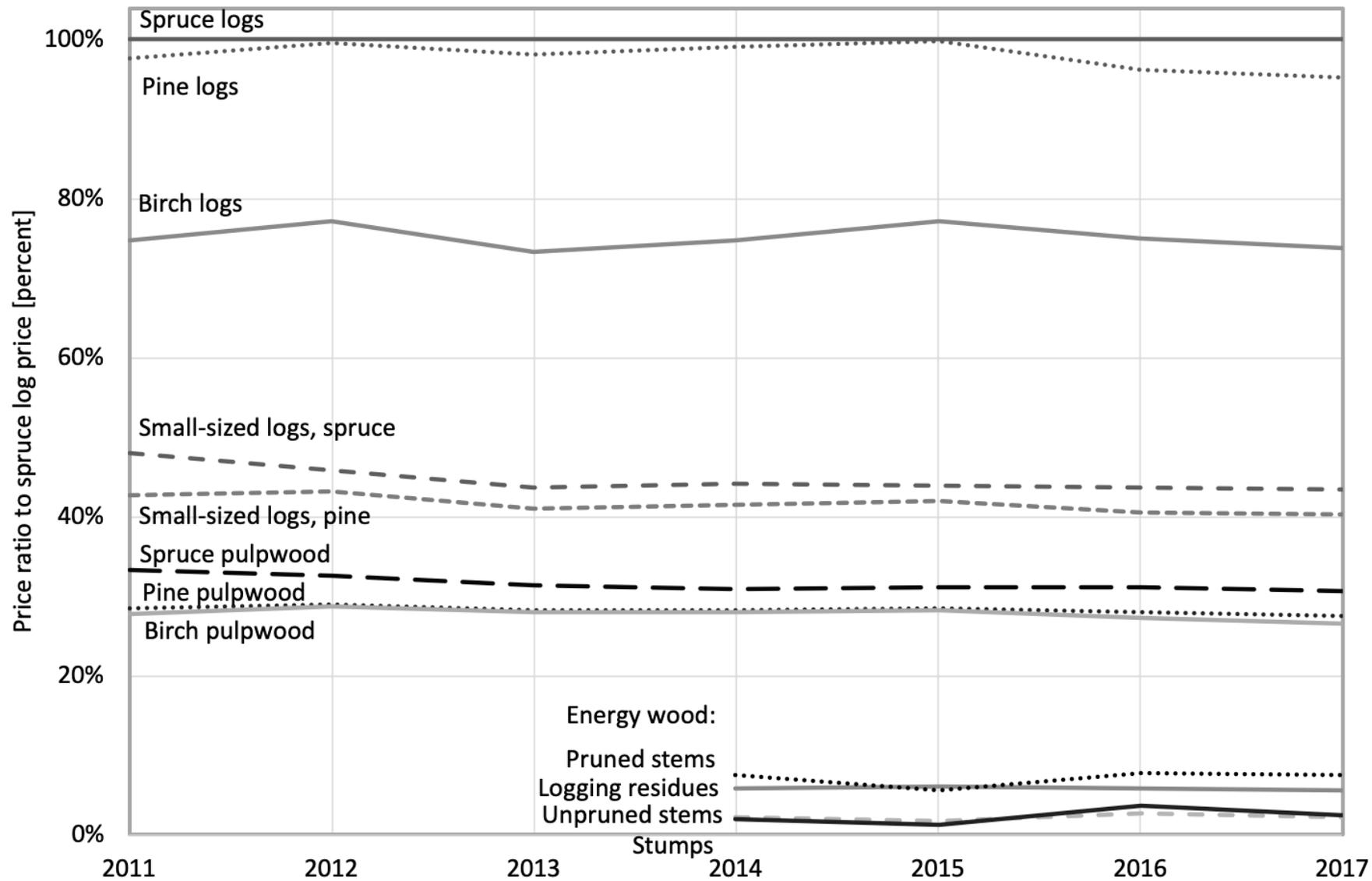
Bioenergy chains in Sweden, Finland, Norway and Denmark, 1990-2015. MWh per capita. Bioenergy value chains are defined by consumption of biofuels in the conversion link. BHP = biomass to heat and power.



□ Standing volume (← left axis)

..... Share of total land cover (right axis →)

Standing volume of productive forest (million m<sup>3</sup>) and productive forest area in percent of total land cover in Sweden, Finland, Norway and the EU, 1950-2016 (or nearest year with available data).



Prices of roundwood and energy wood in % of the spruce log price, Finland, 2011–17. Stumpage prices, i.e., before delivery costs.

## Interviews in Troms county, Norway:

“Some local politicians had strong focus on how wrong it could become, with smoke, smell and all the transport. The most active opponents represented the asthma and allergy organization. A year after it was established, however, it was stated in the newspaper that it was okay. Resistance may also have been linked to the fact that those who owned the new district heating plant came from outside, and that the local power company did not establish first.”

“When those grants came in, and when you pour a lot of public money into an industry and it becomes a bit lucrative, there are some that see the opportunity. Some are doing well and others are doing something that is a bit on the edge. Some cowboys gladly see the opportunity to earn some money if there is a chance.”

Sustainability risks in the Nordic countries have been managed by developing an institutional framework involving laws, regulations, standards and community commitments.

Particularly on the local level, bioenergy chains should be developed with stakeholder involvement in development and use, in order to safeguard the legitimacy of bioenergy development and reconcile tensions between the global quest for a climate neutral economy and the local quest for an economically viable community (the “glocal” concept).

ORIGINAL ARTICLE

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A red tractor with a large pile of brush on its back in a forest clearing. The tractor is equipped with a large black hydraulic arm and a grapple attachment, which is currently holding a large pile of brush. The tractor is parked on a cleared area with many trees in the background. The sky is blue and the overall scene is bright and clear.

Thank you for your attention

Photo: Kjersti Holt Hanssen