

# Small-scale machinery in forest thinning

results of research program on mechanization of forest operations and forest bioenergy



Fuel consumption 4.5 L h<sup>-1</sup> (0,5 L m<sup>-3</sup>).

Average productivity 6.2 m<sup>3</sup> h<sup>-1</sup> or 9 h ha<sup>-1</sup> (average tree 0,06 m<sup>3</sup>).

Hourly cost - 42-50 € (heavily affected by salary rate).

Harvesting cost 10 € m<sup>-3</sup> (for middle class harvester in similar conditions - 13.6 € m<sup>-3</sup>).

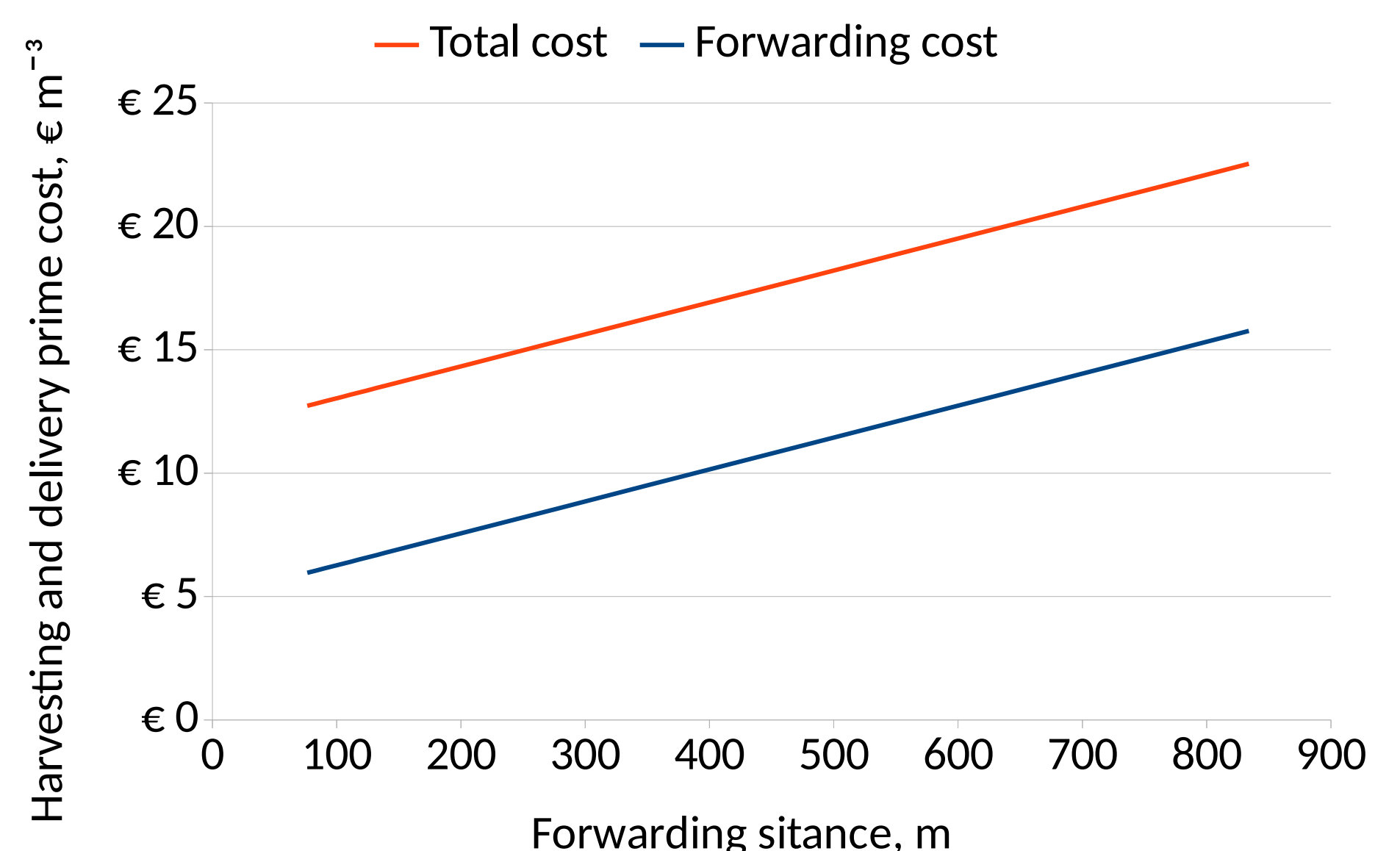
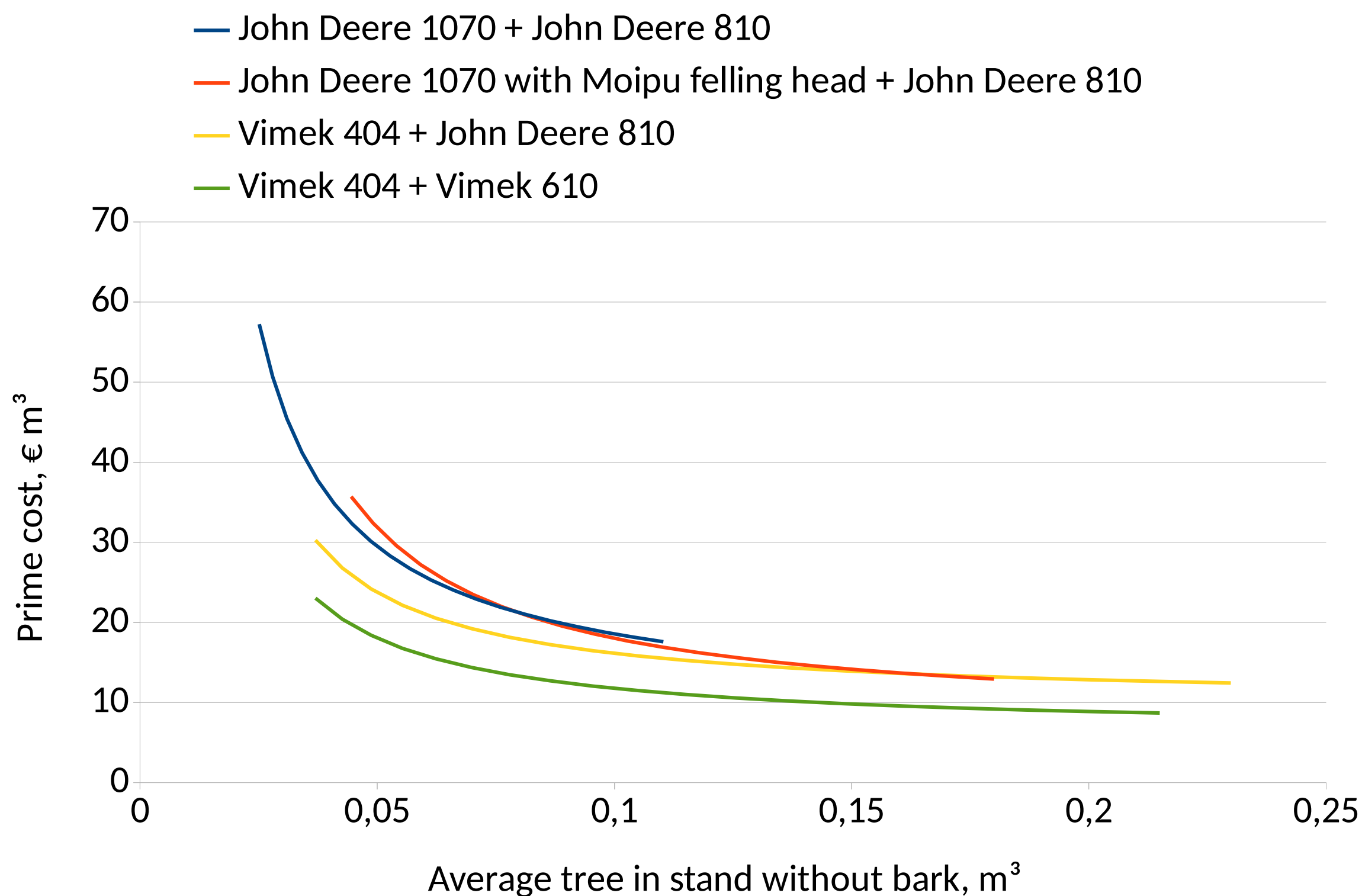
Total harvesting and forwarding cost using Vimek harvester and Kranman forwarder is 17.5 € m<sup>-3</sup>, with Logbear forwarder - 14.7 € m<sup>-3</sup> (with middle class harvester and forwarder in similar conditions - 19.3 € m<sup>-3</sup>).

Fuel consumption 1.8 L h<sup>-1</sup> (0.4 L m<sup>-3</sup>).

Average load 2.2 m<sup>3</sup>.

Hourly costs - 25 €.

- **Applicable in manually extracted forests.**
- Can operate on soils with low bearing capacity.
- Optimized scenario:
  - 4 workers with chainsaw;
  - Kranman Bison 10000 forwarder;
  - car with full weight of at least 2,5 tonnes with trailer
- Felling sites suitable Kranman Bison 10000:
  - sanitary fellings with small dimensions of extractable trees, especially if forwarding should be done through stands without strip-roads;
  - forwarding of single extracted trees (dimensions of assortments should be considered);
  - small thinning and final felling sites, especially grey alder and willow stands.



Fuel consumption 5 L h<sup>-1</sup> (0.7 L m<sup>-3</sup>).

Average load 3.8 m<sup>3</sup>.

Hourly costs - 33 €.

- Productivity in trials 7 m<sup>3</sup> h<sup>-1</sup>.
- Forwarding prime cost 5.7 € m<sup>-3</sup>.
- In thinning Logbear F4000 can serve 4 workers with chainsaws or 1 harvester.
- Applicable in all kind of thinnings, preferably with short forwarding distances,
- Strip-roads with ruts left by wheeled machine should be avoided.
- Residues should be used to protect tracks.