SecureChain
sustainable biomass energy

Pilot Project Factsheet

Funded by the European Commission Horizon 2020 grant agreement no. 646457
01/04/2015 – 31/07/2018

Innovative biomass harvesting machine for top- and branch wood

Project partners

HISSINK & ZN
uw mechanisatie-partner

Buurtweg 42
6971 KM Oeken (Brummen)
The Netherlands
www.hissink-oeken.nl

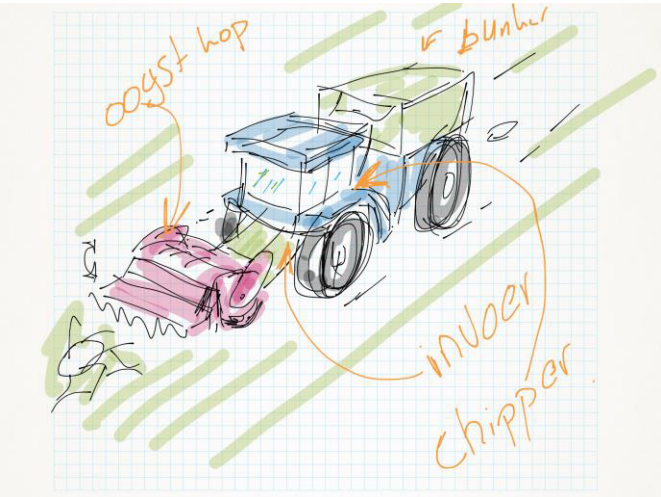
iNodes
Engineering Company
info@inodes.nl

Zilverlinde 24b
7131 MN Lichtenvoorde
The Netherlands
www.inodes.nl

Pilot project concept

In the Netherlands, a high population density and a fairly limited forest cover (11% of the land area) mean it's important to consider a range of biomass feedstocks for renewable energy production. An untapped potential of woody biomass from forests and landscape elements is the top- and branch wood that becomes available as a result of forest and landscape maintenance.

For the process to be economically viable and considering the small average plot size in the Netherlands, it is important that top- and branch wood can be removed in a low-cost, efficient way. In this pilot project a machine was developed that can harvest, chip and transport top- and branch wood in a single pass. This avoids the use of separate cranes and forwarders.



Partners

Hissink & Zonen is an all-round mechanization company, located in Oeken (Gelderland/NL). Hissink has evolved from an agricultural mechanization company to a supplier and developer of tractors and machinery for landscaping, forestry and agriculture, including specialised machinery for biomass harvesting, collection and logistics.

Activities

With support of the engineering company iNodes a design was made for the new single-pass machine. In several iterations a collection unit was engineered that would be able to collect top- and branch wood, and to transport this material to a chipper. This collection unit was designed to be able to operate on relatively uneven ground.

Funded by the European Commission Horizon 2020 grant agreement no. 646457
01/04/2015 – 31/07/2018

SecureChain Partners

btg biomass technology group

Josink Esweg 34
7545 PN Enschede
The Netherlands
www.btgworld.com

BOKU

University of Natural Resources and Life Sciences
Institute of Waste Management
Muthgasse 107
1109 Vienna, Austria
www.wau.boku.ac.at/abf

Next, a prototype was built and tested; first in-house, and later on in an actual forest stand. Applying life-cycle assessment (LCA) SecureChain partner BOKU (Vienna) studied the environmental advantages of using the machine as compared to the current practice. An exploitation calculation was made to determine the viability of investing in further development of the machine.

Results

The prototype machine was constructed in 2016/2017 at the facilities of Hissink (see picture). Use was made of an existing mobile chipper, and the collection device was constructed and mounted up-front. In-house testing showed that the machine functioned well, and basic functions (movement, raising and lowering of the collector unit, chipping, emptying the chips storage container) could be performed without problems.

After the in-house test, the machine was field tested in the estate “De Treek” in the Netherlands (see picture). During the field test it appeared that the machine was not working optimal yet, and that further developments were required. In addition, the weight of the machine (10 tonnes) appeared rather high in light of its intended application. This can be problematic on sensitive forest soils.

The LCA study of BOKO showed positive results in terms of CO_2-eq emissions when the machine is compared to the alternatives. The exploitation calculation indicated that the development of this machine could be financially attractive.

Follow-up

The additional developments required to make the machine ready for the market will mean that extra investments in R&D are needed. Funding for this is being sought.