

Agriculture land afforestation with fast-growing woody crops: economic evaluation according to yields of previous experimental trials

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Kristaps Makovskis¹, Dagnija Lazdina, Dina Popluga

¹Latvia State Forest Research Institute 'Silava' (LSFRI Silava)

e-mail: kristaps.makovskis@silava.lv

Introduction



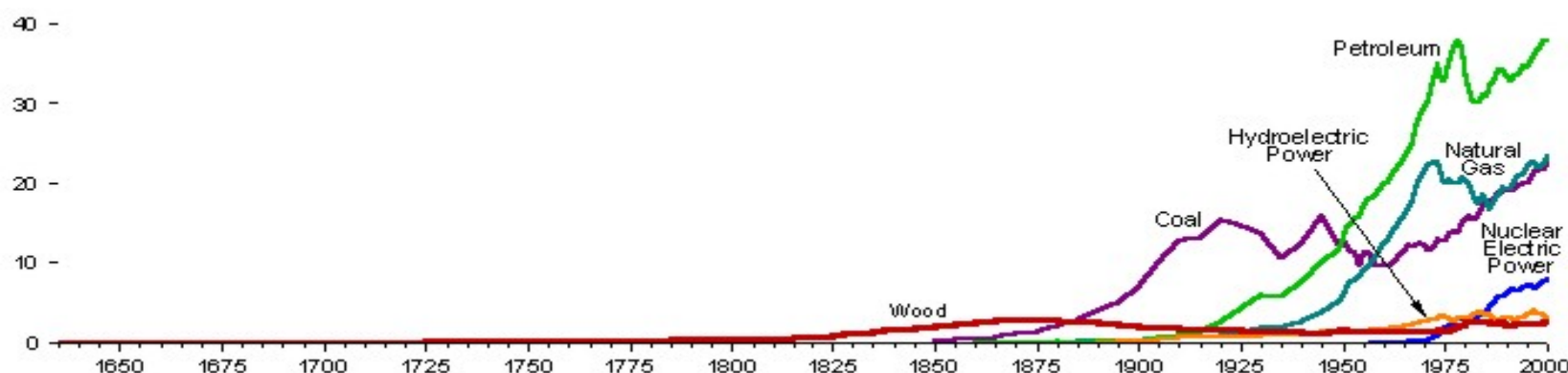
Until the 19th century, society mainly had used renewable resources for energy production, while in the 20th century, primarily non-renewable resources.

In response to the future climate change challenges, non-renewable resources will increasingly be replaced by renewable resources.

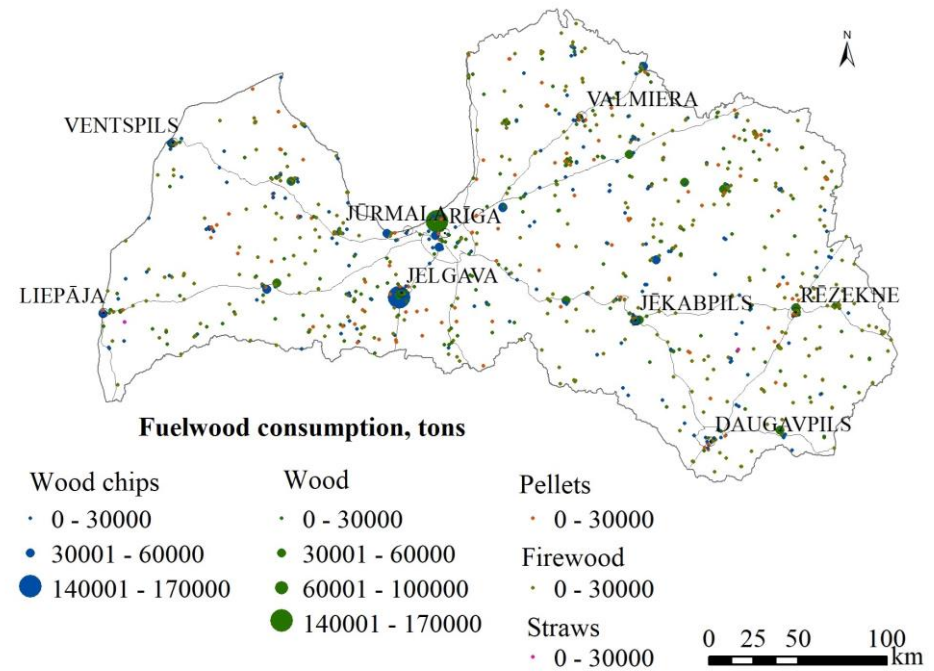
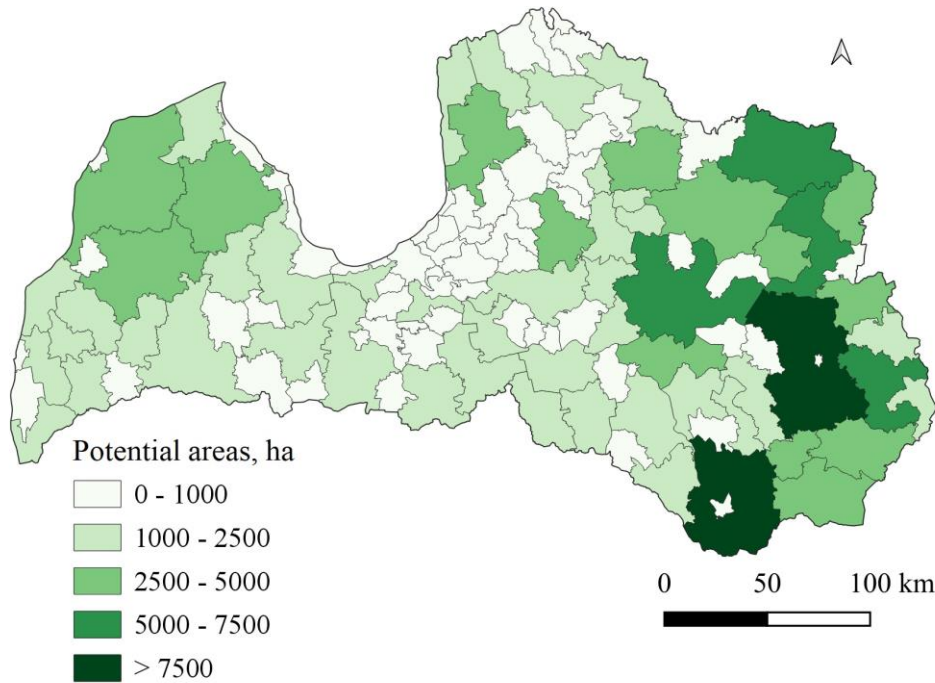
Biomass has become a significant resource for renewable energy production in many countries.

In Latvian conditions, biomass can be successfully obtained in fast-growing woody crop plantations by installing them in unused agricultural land.

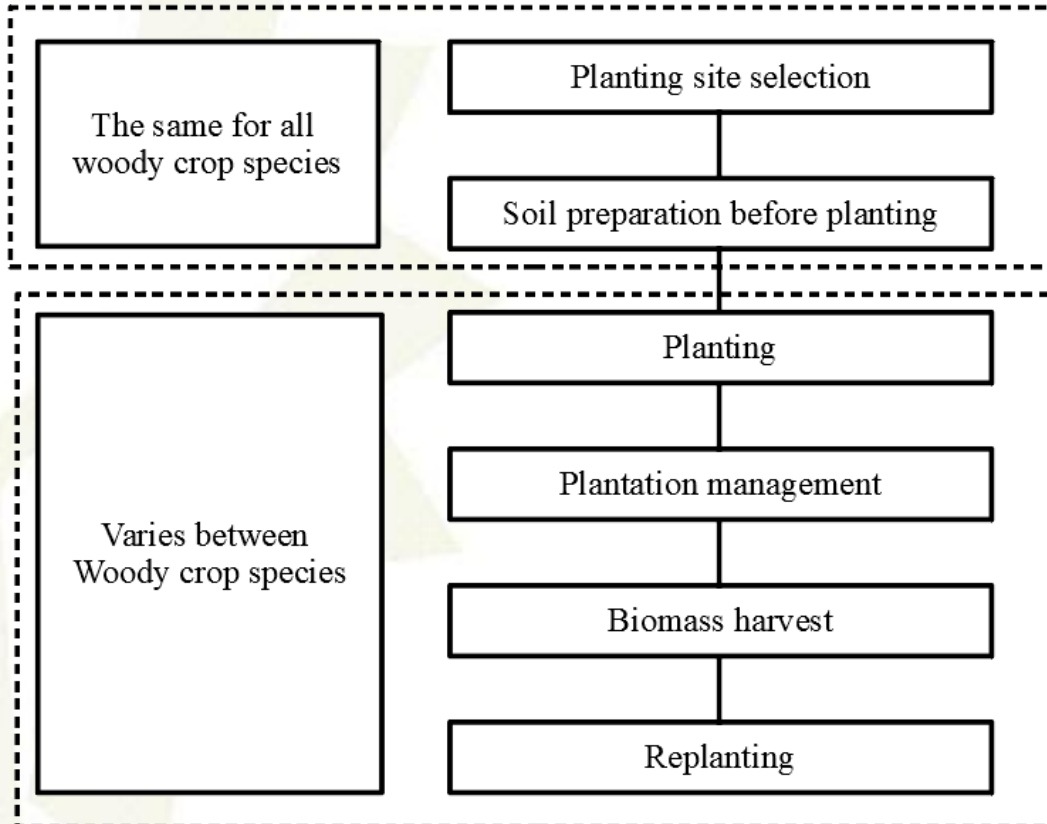
Based on the Rural Support Service (RSS) data, in 2019, were 2.2 MM hectares of agricultural land, of which 256 180 hectares were uncultivated.



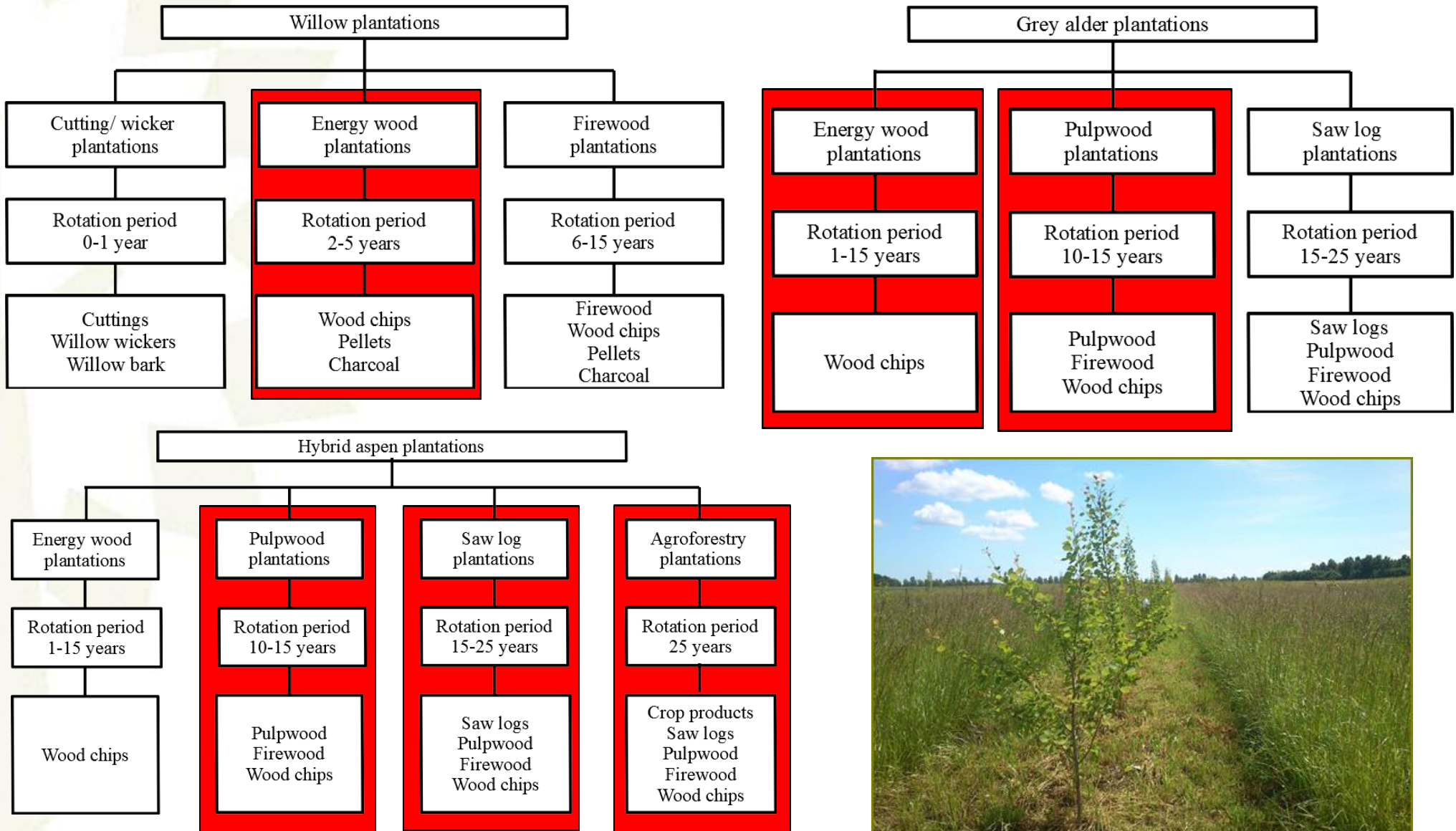
Potential of woody crop plantations



Woody crop management



Woody crop plantations



Willow plantations

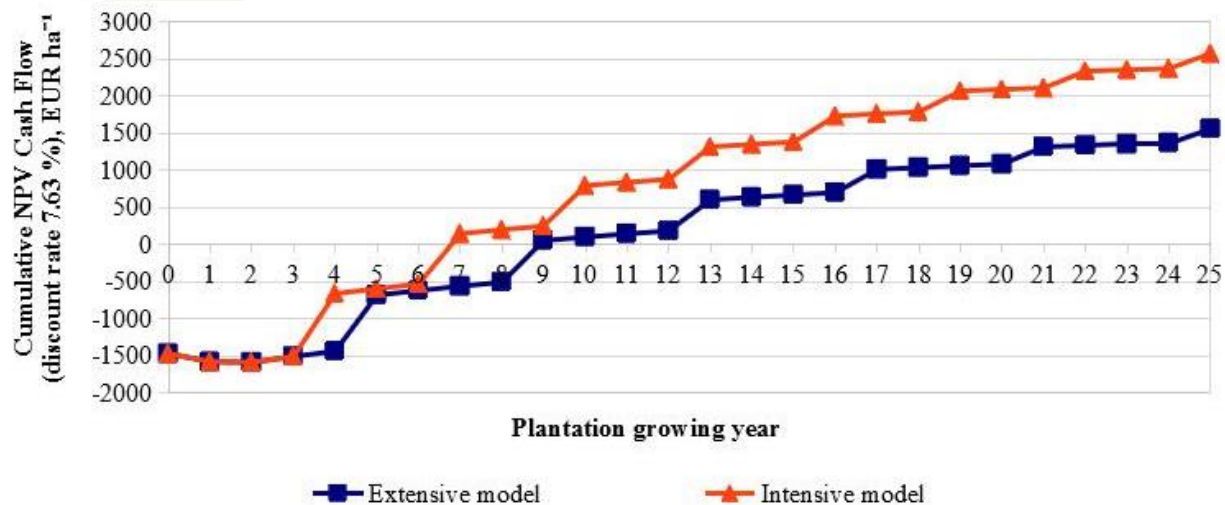


Intensive managed plantation

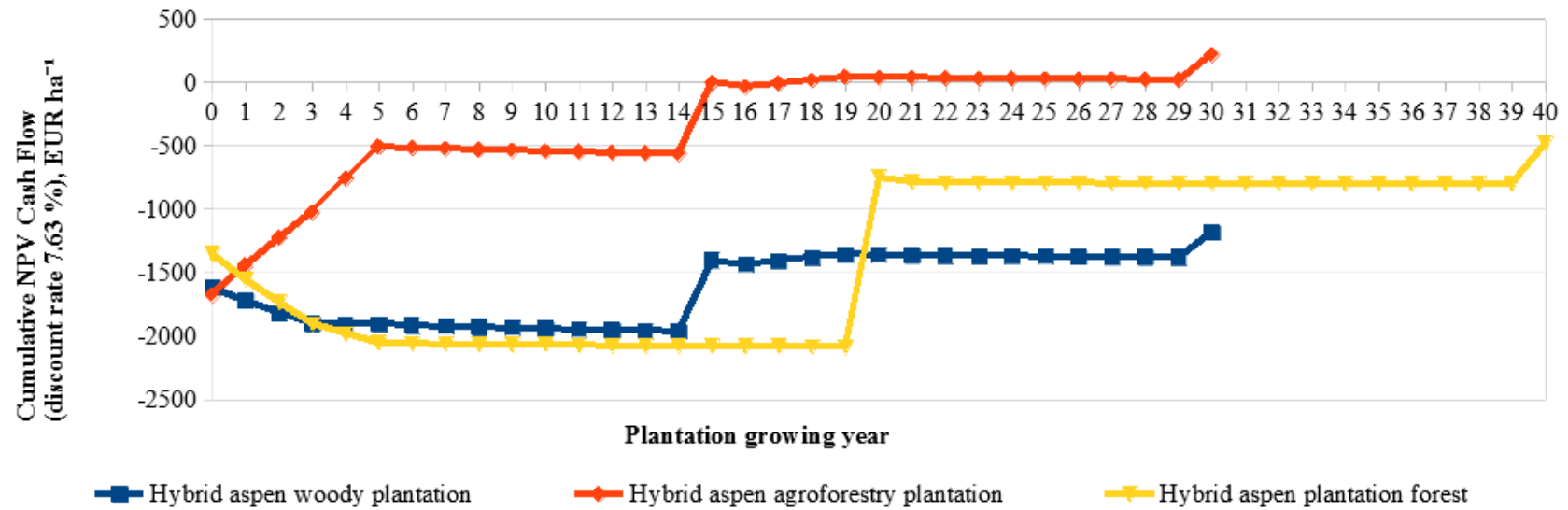


Extensive managed plantation

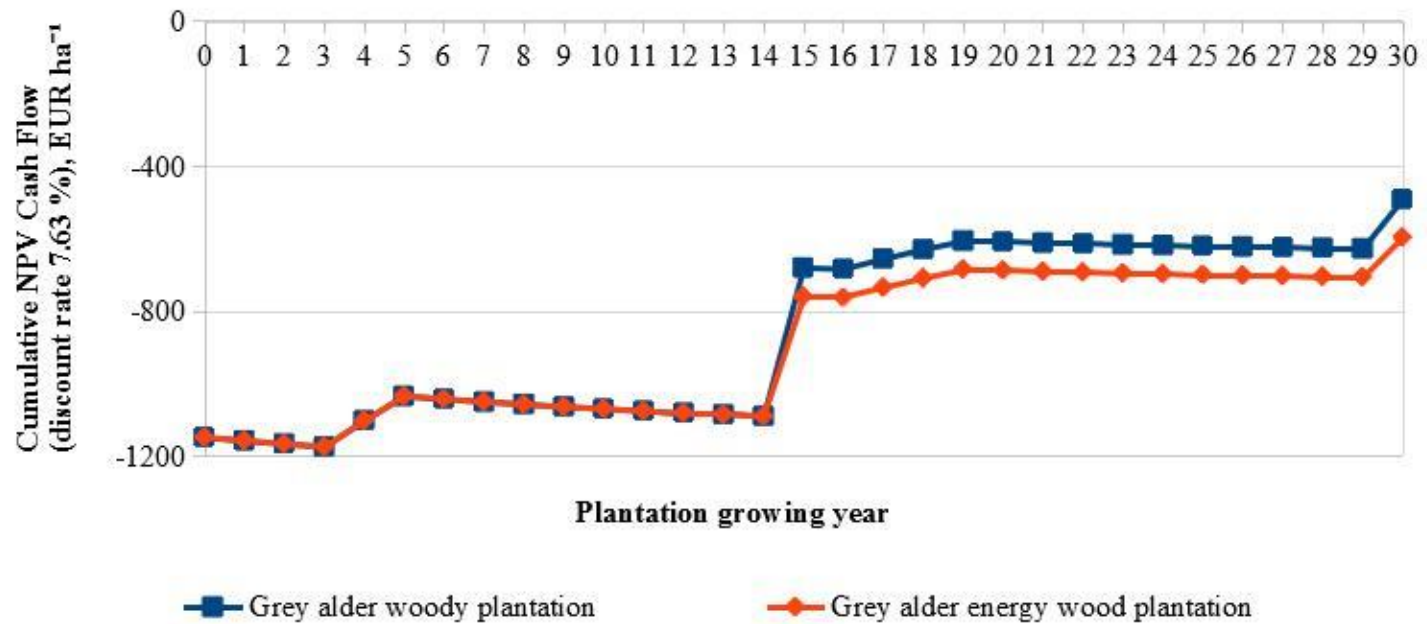
Willow plantations



Hybrid Aspen plantation



Grey alder plantations



Economic indicators during plantation lifespan in Latvia



Plantation type	Payback period, years	NPV, EUR ha ⁻¹	IRR, %
Willow extensive management model	8.9	1561.91	15.0
Willow intensive management model	6.8	2576.64	19.3
Hybrid aspen agroforestry plantation	17.4	215.31	9.1%
Hybrid aspen plantation forest	No payoff	-484.22	6.4%
Hybrid aspen woody plantation	No payoff	-1184.63	2.6%
Grey alder woody plantation	No payoff	-490.84	4.3%
Grey alder energy wood plantation	No payoff	-596.14	3.1%



Conclusions



Discount rate of 7.63%, average service costs and product selling prices for period 2015-2019, and under the existing plantation support system in 2021,

Positive accumulated discounted cash flow shows:

intensively managed willow plantations;
extensively managed willow plantations;
hybrid aspen agroforestry plantations.

Negative accumulated discounted cash flow shows

hybrid aspen woody plantations
hybrid aspen plantation forest
grey alder energy wood plantations
grey alder woody plantations

Factors that affect plantation cash flow and therefore economic return are plantation product selling price and harvested biomass volume.

Plantation fertilization is one of the ways, how to increase biomass volume from the plantation.

Thank You for Your attention



Acknowledgement: Elaboration of innovative White Willow—perennial grass agroforestry systems on marginal mineral soils improved by wood ash and less demanded peat fractions amendments. 1.1.1.1/19/A/112 ERAF.

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