Annual update 2021 - Forest Value GreenLane
Fast tracking value and resilience in industrial wood supply

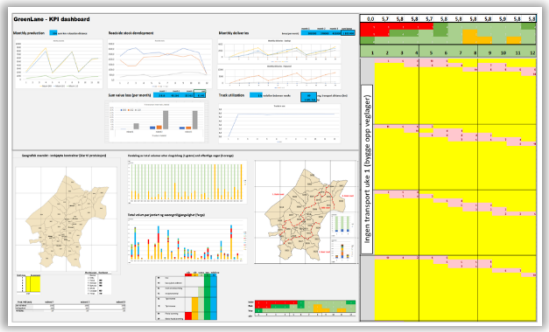
The overall goal of the project is to develop virtual supply chain laboratory environments for testing alternative wood supply management practices under challenging climate scenarios. The focus is on implementing weather-driven models to ensure preserve log quality in the face of warmer weather and increasingly challenging seasonal road availability.

Extended lead times between harvesting and delivery lead to wood value losses resulting from fungi, insects or changing mechanical/chemical properties. To guarantee that harvested wood arrives at industry with the specified quality fulfilment, well-coordinated harvesting and transport management is important. The project focus during the last year has been on the development of virtual laboratory environments for testing alternative approaches to ensuring delivery of fresh wood from forest industry in the face of new and changing weather conditions.

Integrated weather-driven frameworks for wood quality (IBM) and road availability (RBC) were developed during the first project phase (2019-2020). The IBM-model integrates the operational value drivers: Insects (I), Blue stain (B) and Moisture content (M). The IBM model enables value-tracking of log stacks in the forest based on the annual progression of weather parameters in order to specify maximum permissible lead times. The road availability model (RBC) captures the main operational drivers for seasonal availability (temperature, precipitation and snow depth) for private forest roads of varying surface deposit materials. Both the IBM- and the RBC models were presented at the NB-Nord research conference (Copenhagen, Denmark) in Sept 2020 and in the FORMEC/COFE conference (Corvallis, Oregon) in Sept 2021.

Region-specific virtual laboratory environments were developed the second phase (2020-2021). The context and focus varies between the regional cases, but all use lead times between production and transport as a basis for value-tracking. The continental-montane model (AT-BOKU) was developed for handling salvage operations and was therefore focused on contingency plans for system capacity. In this case weather patterns for 3 climate zones (reflecting altitude) drive the lead time limits for value loss. The sub-artic (SE-Skogforsk) and oceanic (NO-NIBIO) models were developed for tuning business-as-usual operations where week-specific weather patterns drive area availability for harvesting and transport. In the oceanic case, weather data for 3 climate zones (reflecting distance from the coastline) drive road availability.

Regarding contingency planning for salvage logging (AT-BOKU), Dr. Christoph Koglers article "Contingency plans for the wood supply chain based on bottleneck and queuing time analyses of a discrete event simulation" (Forests, 11(4), 1–23, https://doi.org/10.3390/f11040396) received the Best Paper Award from the Jubilee Fund of the City of Vienna for scientific excellence and high practical relevance for stakeholders along the entire wood supply chain. The game-based workshop approach is documented in the International Journal of Simulation Modelling, 19(3), 446–457, https://doi.org/10.2507/IJSIMM19-3-526).



For business-as-usual coordination of purchase, production and transport (NO-NIBIO) participant teams worked directly in function-specific interfaces with shared team KPI-dashboards. In this case, teams competed under identical supply scenarios, developing management guidelines for varying weather conditions. KPIs measured team performance with respect to: operational efficiency (relocation and truck transport distance), mill service (monthly delivery precision and corresponding bonus) and delivered wood value (% volume delivered within stipulated lead time limits with corresponding value loss).

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