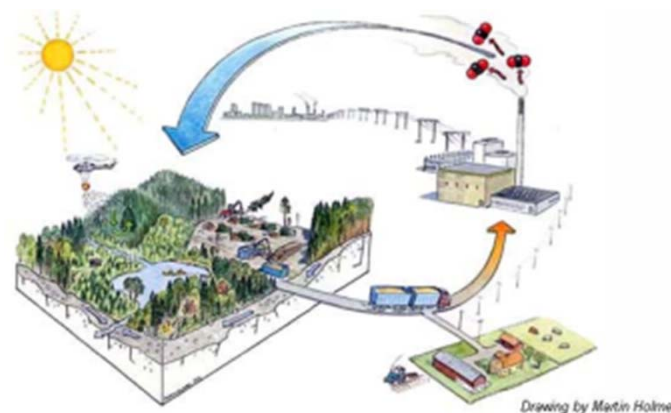
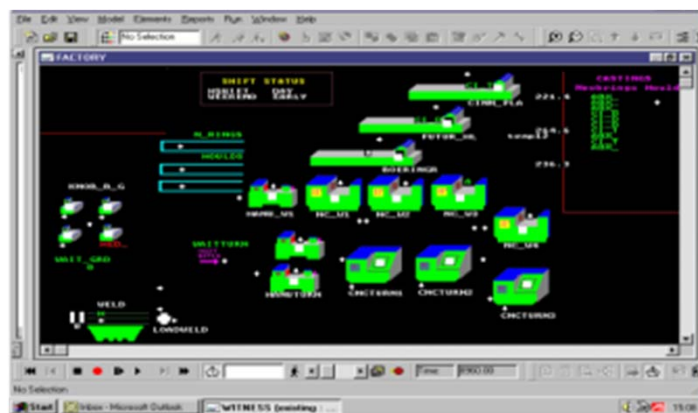




Forest Energy Action

Development and Harmonization of New Operational Research and Assessment Procedures for Sustainable Forest Biomass Supply

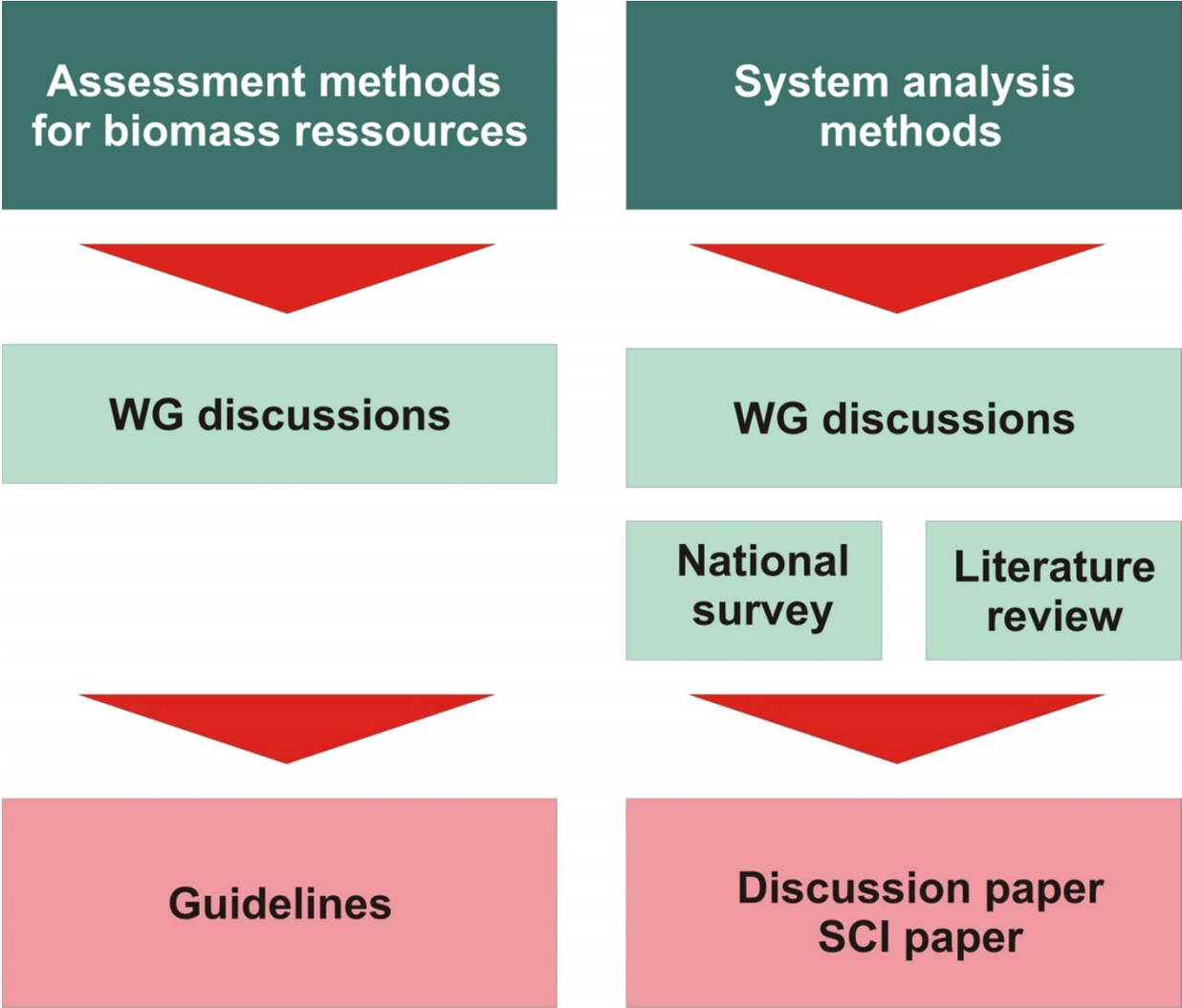
System Analysis and Modeling in Forest Energy Results versus Objectives



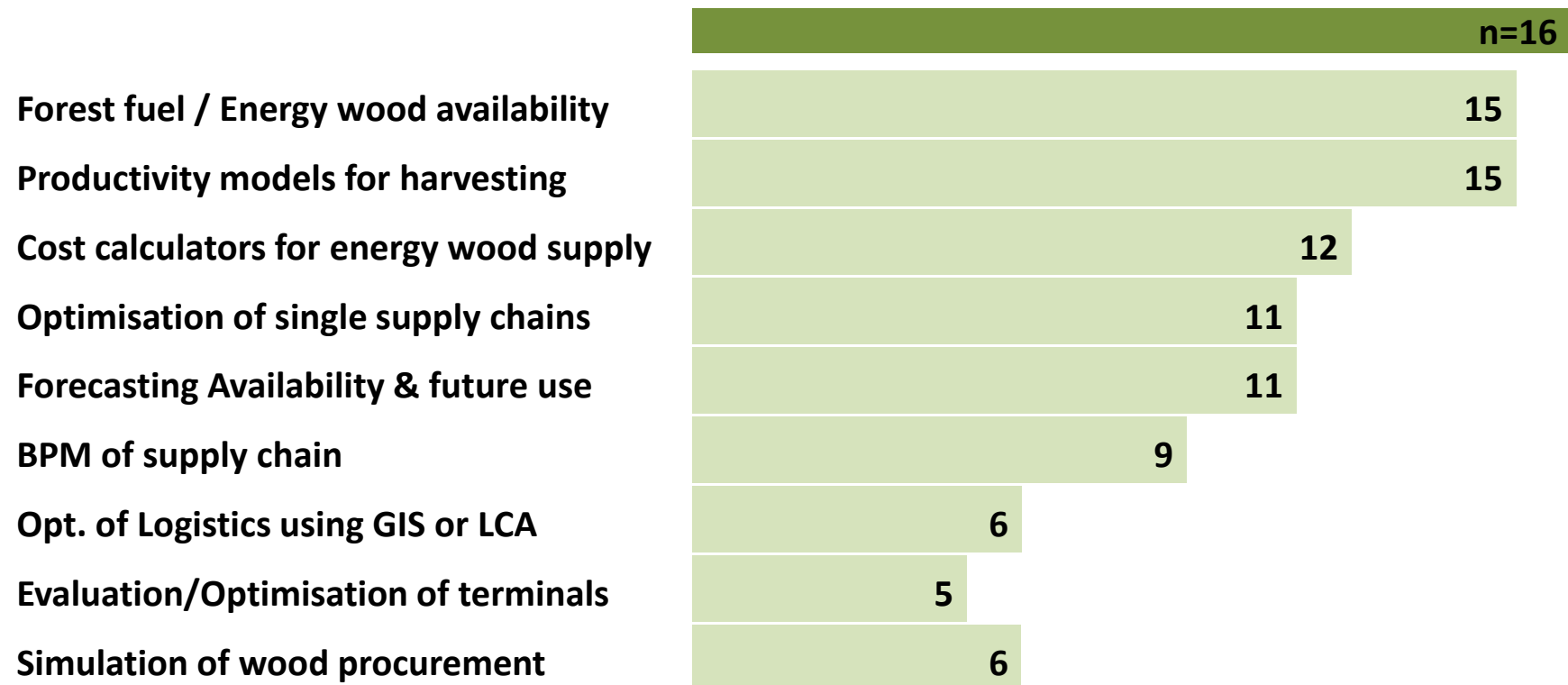
Karl Stampfer & Mark Brown



Methodological Framework



Scope of System Analysis & Modeling



Purpose of System Analysis & Modeling



n=16

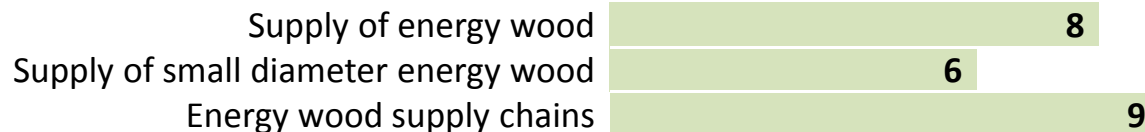
Business Process Mapping to:



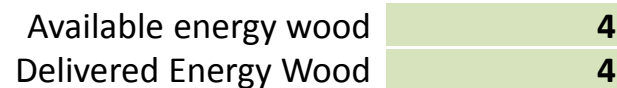
Develop Cost Efficient Methods to:



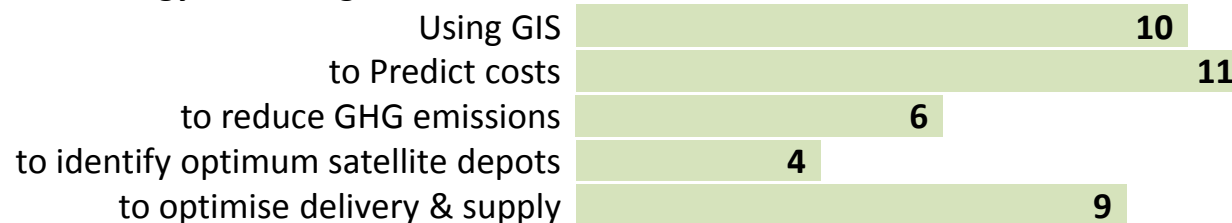
Develop Cost Calculators for:



Develop Energy Calculators for:



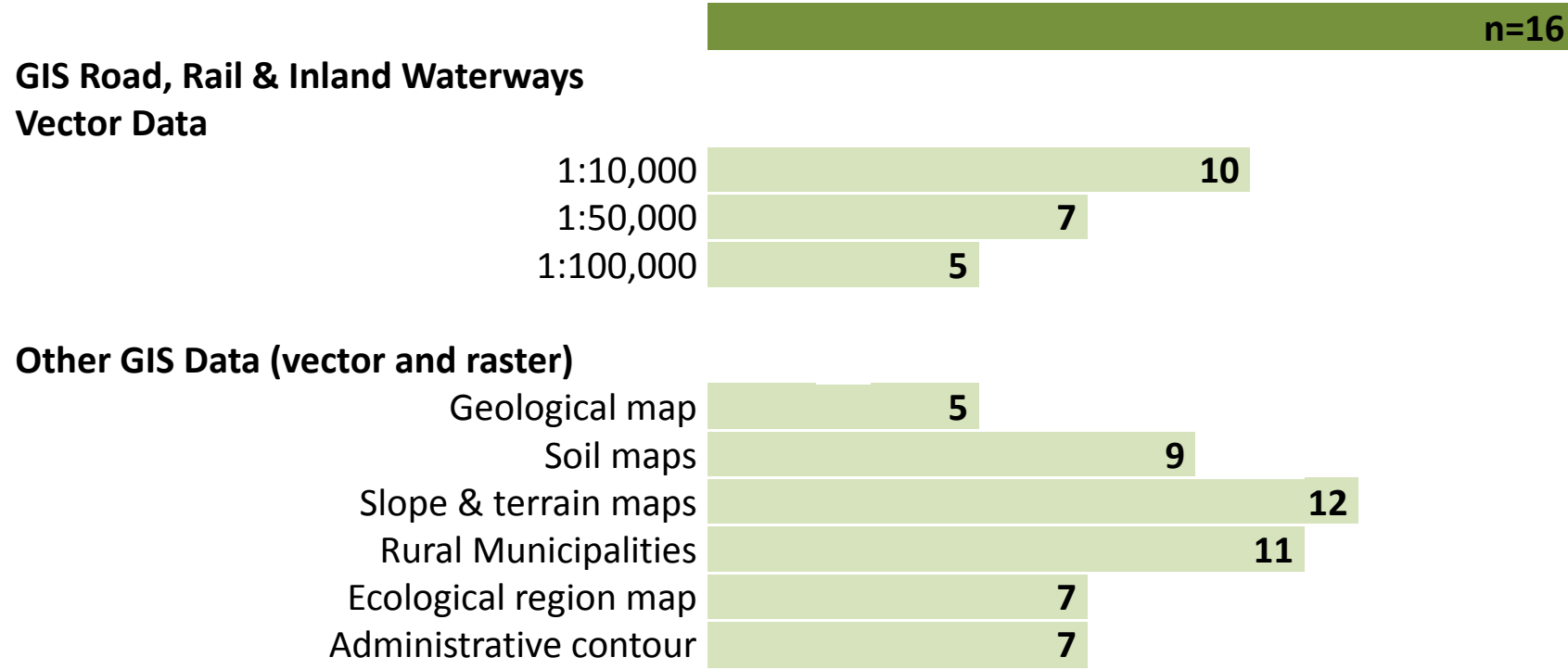
Optimisation of Energy Wood Logistics:



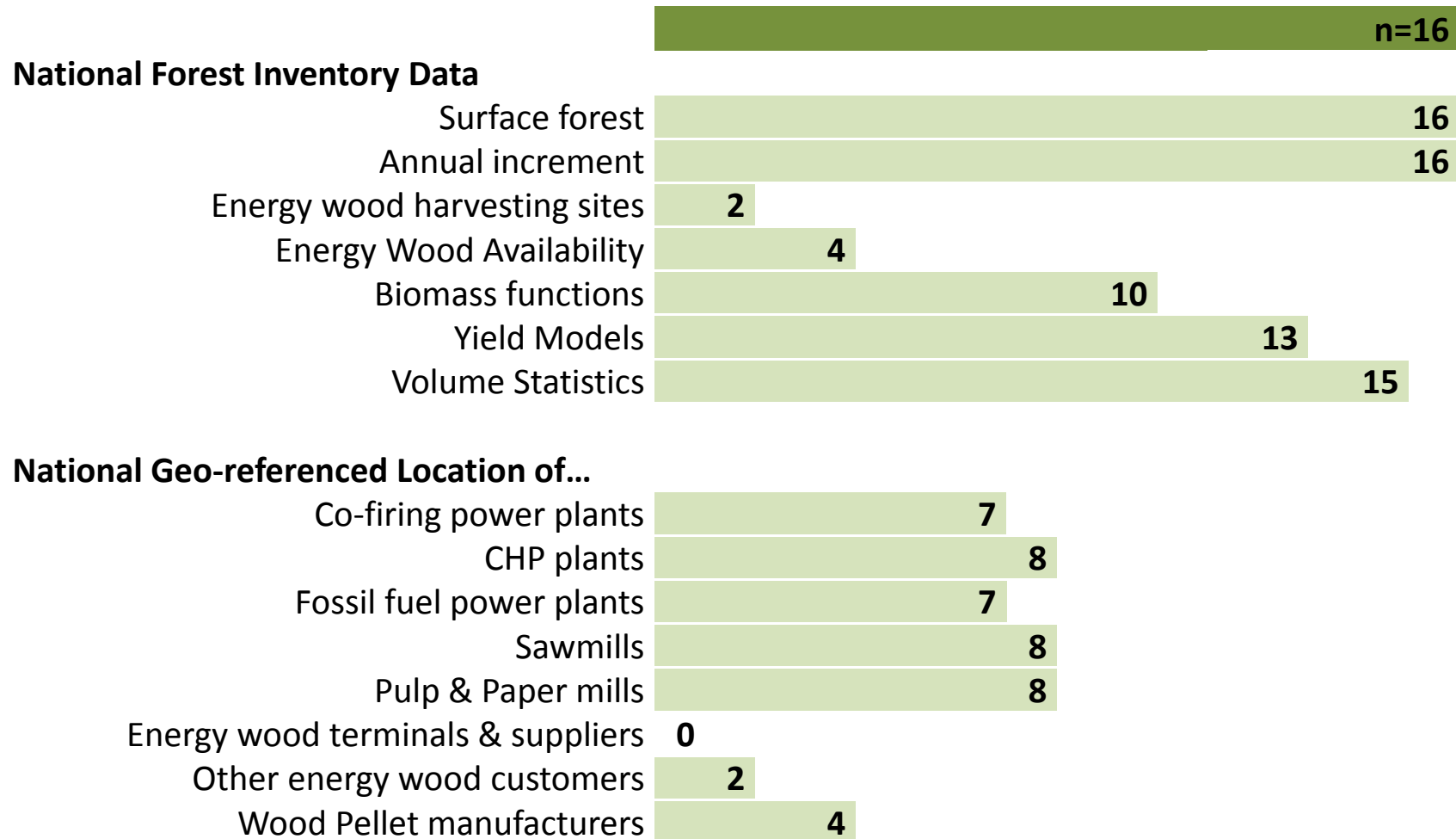
Forecasting Models to identify:



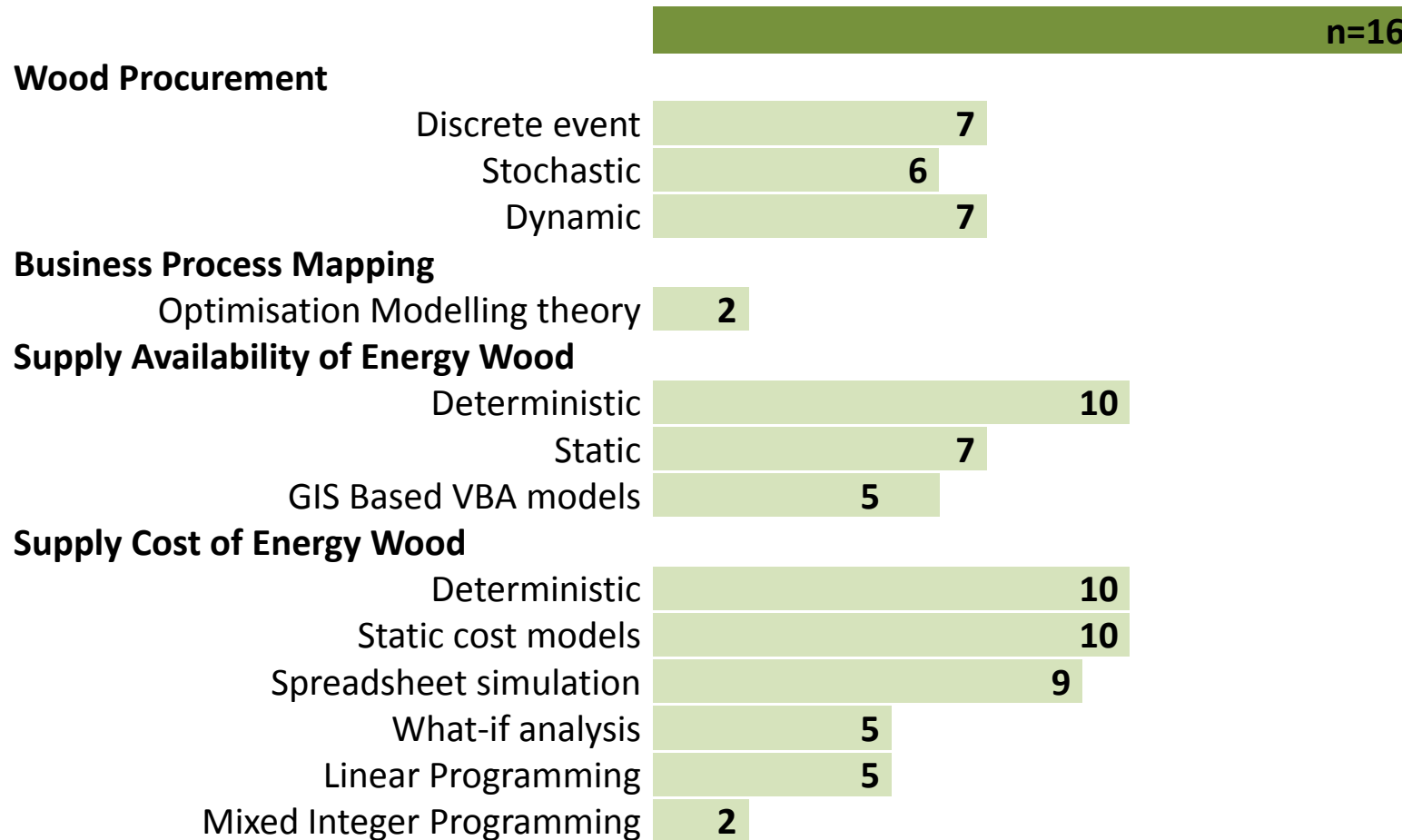
Data Sources of System Analysis & Modeling (1)



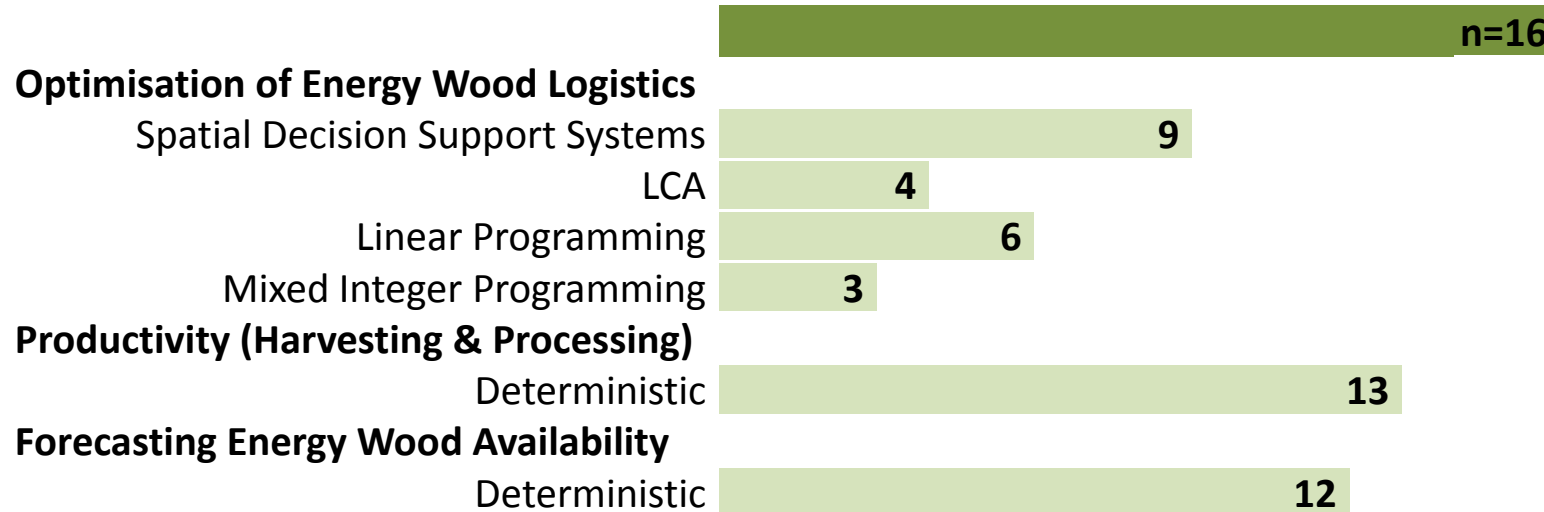
Data Sources of System Analysis & Modeling (2)



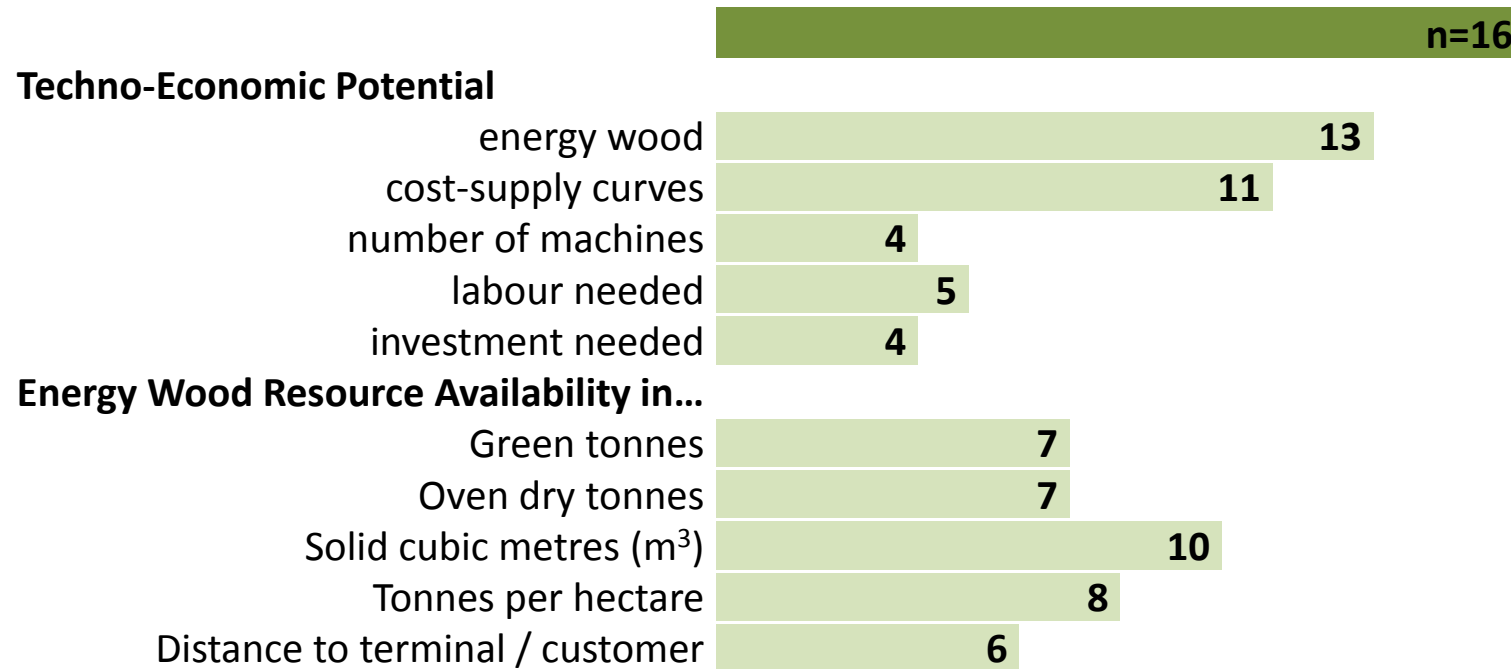
Model Types of System Analysis & Modeling (1)



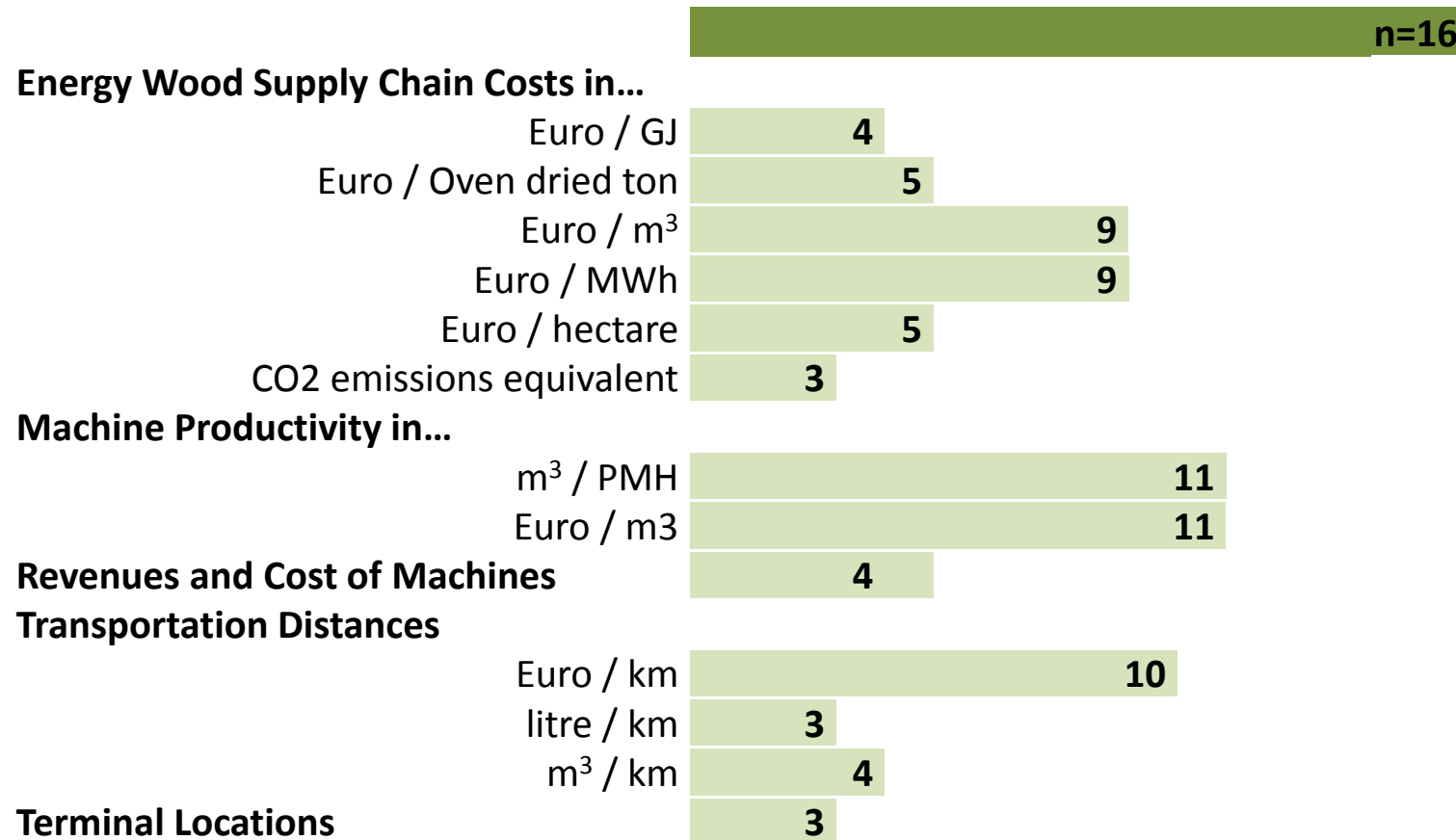
Model Types of System Analysis & Modeling (2)



Modeling Outputs of System Analysis & Modeling (1)



Modeling Outputs of System Analysis & Modeling (2)



Dissemination



Harmonization of biomass resource assessments

Volume I
Best Practices and Methods Handbook

Del. No: D 5.3
IssueRev: 1.0
Date: November 2010



Responsible partner: BTG Biomass Technology Group B.V.
Authors: M.W. Va, BTG
D. van den Berg, BTG
And others (see page 7)
Confidentiality: Programme participants, invited stakeholders

EEF project is funded by the European Commission under the Framework Programme 7 within the "Energy, Transport, Air and Climate" in "Demonstration of biomass resource assessment" activities which focus on assessing and certifying the availability of biomass resources.
FP7 Grant Agreement n° 232477



Discussion Document: System Analyses and Modelling in Forest Biomass Supply Chains (COST Action FP0902 WG 4)



Karl Stampfer, Rien Visser and Mark Brown (editors)

Executive Summary:

Many research projects have been carried out to help solve biomass supply chain problems. These can include system analyses, modelling, simulation and optimization studies. This document serves as a discussion paper for COST FP0902 to effectively summarise scope, purpose and methods utilised by the studies that either have been, or are being carried out.

The information contained in this document includes the summary of the responses given by the partner organisations. It provides the opportunity for contributing members to input specific examples. The overall goal is to improve and harmonize our understanding and approaches to System Analyses and Modelling in Forest Biomass Supply Chains research. It could also be a valuable reference for organisations starting new modelling projects, especially young researchers.

<http://www.eu-bee.com/>

Stampfer, K., Visser, R. and Brown, M. (editors) 2013. Discussion document: system analysis and modelling in forest biomass supply chains. COST Action FP0902, Working group 4. 37 p.



CROATIAN JOURNAL OF FOREST ENGINEERING
ISSN 1845 - 5719

Stampfer, K., Asikainen, A., Visser, R. and Brown, M. 2013. System Analysis and Modeling in Biomass Supply – A review. Croatian Journal of Forest Engineering 34 (2): xx-xx.

WG 4



System analysis & Modeling in forest operations

COST Final Conference 2013, Joensuu, Finland - 11



Main Biomass Supply Issues/Problems



- Forest biomass potential and supply costs
- Machine and harvesting system evaluation
- Interaction crusher or chipper and truck, when direct loading
- Management of forest biomass supply chains
- Facility location (e.g. terminals)
- Truck routing and scheduling
- Integration of train and ship
- Backhauling
- Co-operative forest fuel procurement; Inter-enterprise collaboration
- Multi-objective supply network optimization



Method selection guide



| Biomass supply issue/problem | Potential methods | Useful references |
|---|--|---|
| Forest biomass potential and supply costs | Forest Inventory GIS Time consumption or productivity models | Vis and van den Berg 2010 (Guideline) Anttila et al. 2011 |
| Machine and harvesting system evaluation | Productivity model (System costs) | Magagnotti and Spinelli 2012 (Good practice guideline) Ghaffariyan et al. 2011 Rottensteiner et al. 2008 |
| Facility location (e.g. terminals) | GIS Linear Programming Mixed Integer Programming | Melo et al. 2009 (review paper) Johnson et al. 2012 (review paper) Kanzian et al. 2009 Palander and Voutilainen 2013 |



Impact Analysis



| Main activity/Milestone | Impact |
|---|--|
| <p>Training school: System Analysis in Biomass Utilization BOKU and CNR, Vienna, 6.-12.6.2010</p> | <ul style="list-style-type: none"> • Improve operations research skills of PHD students and early stage researchers (educational impact) |
| <p>Compilation of national reports and writing a review paper about system analysis and modeling in biomass supply</p> | <ul style="list-style-type: none"> • Harmonize modelling and optimisation studies in biomass supply (e.g. INFRES or LAAVA) • Create a better understanding of the application of OR methods in biomass supply (scientific impact) |
| <p>FORMEC/Austro 2011 – International conference Pushing the boundaries with research and innovation in forest engineering Graz, 9.-12.10.2011</p> | <ul style="list-style-type: none"> • Accelerate international networking • Strengthen forest operation as a scientific discipline • Promote the utilization of woody biomass |

