

Final report for Centre of Advanced Research (CAR)

Submit the report to sns@slu.se by 24:00 CET, 1st of March 2022, at the latest.
 The report should not exceed 4500 words (including words in the template).

Please adjust the size of the box according to the length of your answer.

1. Project title:	The Nordic forest-based sector in the bioeconomy - NOFOBE
2. Reporting year:	2016 - 2021
3. Project coordinator:	Hans Fredrik Hoen
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Activity report

4. Provide a project summary, including:
<p>a) The purpose of the project/main problems /hypothesis addressed</p> <p>The NOFOBE-CAR focused mainly on solid wood industries, forest-based process industries, and international policy and market developments. While solid wood products constitute the “economic engine” in the forest-based value-chains in Nordic countries, it is dependent on viable forest-based process industries, which can utilize biomass residues such as saw-mill chips, bark and sawdust for value added products like biochemicals. Since the future of the Nordic forest-based sector depends heavily on developments in international policies and markets, it is necessary for this CAR to also consider these issues, as well as their combined impacts on the Nordic forest-based sector.</p> <p>With the above background, the objectives of the CAR include establishing and strengthening multidisciplinary research and post-graduate education collaboration in the Nordic countries, initiating and applying for financial support for advanced joint research projects, and serving science-policy interaction and decision-making in forestry and the forest-based industries.</p> <p>b) A short description of the main activities of the project</p> <p>NOFOBE concentrated on three activities, i) Organising research workshops and seminars, ii) Short-term scientific missions (STSM) and iii) Analysing Citizens’ knowledge of and perceptions of multi-storey wood buildings in selected European countries based on two large-scale online surveys. Below we report main results and outputs from each of these.</p> <p>i) Research workshops and seminars.</p> <p>2016:</p> <p>Forest-Based Bioeconomy Week (FBBW) 24th-27th of May. Joint with EFINORD and SNS-NJK 02 on 24th of May “Sustainable production of forest biomass for the Northern Europe in a climate change context” at Gardermoen, Norway with around 25 participants and joint with SSFE 25th – 27th of May at Oscarsborg, Norway “Forest-based sector into the bioeconomy” with around 70 participants.</p> <p>NOFOBE workshop 16.-17. Nov., Arlanda, 7 participants arranged jointly with EFINORD-SNS workshop on “Future research topics in forest sciences for Northern Europe”.</p> <p>2017:</p> <p>FBBW: Joint conference and workshop “Industrial scale Bioeconomy and its Requirements” arranged with SNS-CAR NB-Nord in Lappeenranta, Finland mid-June 2017, with around 60 participants. Program: http://www.metsateho.fi/lappeenranta-2017/</p>

Two workshop-meetings – Planning survey (NOFOBE I) on multi-storey wood construction: Finland (Lappeenranta), 16th of June, 4 participants and Finland (Helsinki), 12th of December, 6 participants.

2018:

FBW: Scientific conference, Denmark (Helsingør), 22nd – 25th of May, 2018 arranged jointly with SSFE, with around 75 participants. Proceedings: <https://www.ssfe-network.org/publications/>

Two workshop-meetings – Planning NOFOBE-I survey on multi-storey wood construction: Denmark (Helsingør), 23rd of May, 2018 8 p, and Online meeting 03.10.2018, 6 p.

2019:

Workshop 25th -26th of March, 2019 at SLU-Uluna. Organising responsibilities for analysing, reporting, and preparing manuscripts based on NOFOBE-I survey. 12 p.

14.08.2020 and 29.08.2020. Two Online workshop-meetings for Analysing, reporting, and preparing manuscripts based on NOFOBE-I survey. 4 p. & 6 p.

2020:

12.03.2020, 12.05.2020 & 29.09.2020, Three Online workshop-meetings for Analysing, reporting, and preparing manuscripts based on NOFOBE-I survey. 8 p., 14 p. & 16 p.

18.11.2020 Online workshop for Planning survey and developing questionnaire NOFOBE-II survey. 16 p.

FBW: Scientific conference, initially planned for 12th – 14th of May, Asikkala, Lahti, Finland, postponed to September and due to the Covid-19-pandemic changed to online seminar/webinar, 28th – 30th of September, 2020 arranged jointly with SSFE and IUFRO WG 5.10.00, with around 130 participants. Proceedings: <https://www.ssfe-network.org/publications/>

Nofobe final seminar "Tall timber buildings - user perspectives, policy and future prospects". Initially planned as open stakeholder-conference 18th – 19th of November, Mjøstårnet, Brumunddal, Norway, and due to the Covid-19-pandemic changed to online seminar/webinar, Thursday 19 November, 2020, 12.00 - 16.15. More than 500 participants.

2021:

22.01.2021, 05.02.2021, 18.02.2021 & 02.03.2021, Four Online workshop-meetings Planning survey and developing questionnaire NOFOBE-II survey. 9 p.

31.08.2021 Online workshop-meeting for Organising responsibilities for analysing, reporting and preparing manuscripts based on NOFOBE-II survey. 12 p.

2022:

20.01.2022 Online workshop. Organising responsibilities for analysing, reporting and preparing manuscripts based on NOFOBE-II survey. 13 p.

ii) Short-term scientific missions

2016:

Elias Hurmekoski, EFI-HQ Joensuu visited NMBU, Department of Ecology and Natural Resource Management, Norway during the second half of May 2016. Contact-persons NMBU researcher Hanne Sjølie and professor Hans Fredrik Hoen.

Alex Moiseev, EFI-HQ Joensuu visited NMBU, Department of Ecology and Natural Resource Management, Norway during the second half of May 2016. Contact-person NMBU professor Birger Solberg.

2017:

Kaja M. Aa. Heltorp, Norwegian University of Life Sciences visited University of Eastern Finland, Faculty of Science and Forestry, Joensuu. Contact-persons UEF professor Heli Peltola.

2019:

Jaana Korhonen, University of Helsinki visited Norwegian University of Life Sciences, Faculty of Environmental Sciences and Natural Resource Management. Contact-person NMBU professor Hans Fredrik Hoen.

iii) Analysing Citizens' knowledge of and perceptions of multi-storey wood buildings in selected European countries based on two large-scale online surveys

In the fall 2017 the NOFOBE-partners jointly decided to pool resources (2017+2018) to perform a multi-country survey collecting data on consumer preferences related to multi-storey wood buildings.

2018:

Multi-country data-collection – Nofobe-I survey on multi-storey wood construction. Austria, Denmark, Finland, Germany, Norway, Sweden, UK. 11th – 24th of December 2018. ~7000 observations.

2021:

Multi-country data-collection – Nofobe-II survey on multi-storey wood construction. Austria, Denmark, Finland, Germany, Norway, Sweden, UK. 27th of May – 3rd of June 2021. ~7000 observations.

9 scientific articles in peer-reviewed international journals published (2), in review (3) or under preparation (4), developed jointly by NOFOBE-participants and based on the multi-country surveys NOFOBE I and NOFOBE II.

c) Achieved targets and to what extent the research plan was fulfilled

Targets fulfilled:

NOFOBE CAR fostered Nordic research collaboration in forest-based bioeconomy, in particular related to multi-storey wood construction. NOFOBE strengthened interdisciplinary research and incorporated several post-graduate students and post-doctoral researchers in Nordic research collaboration.

FBBW's were arranged 2016, 2017, 2018 and 2020 (60 – 75 participants). Final conference arranged as webinar in 2020 (due to Covid-19 travel restrictions) with more than 500 participants. Networking activities (17 workshops, mainly online and 4 short term scientific missions) has strengthened contacts and cooperation within the group of participants. 7 scientific articles in peer-reviewed international journals published (2), in review (2) or in prep (3), developed jointly by NOFOBE-participants and based on the multi-country surveys NOFOBE I and NOFOBE II.

Changes and reorientation: FBBW 2019 was put on hold to the 2020-event together with the planned final conference. The NOFOBE-partners agreed to pool resources from the budget (2017-2018) to collect data (multi-country online survey) on Citizens' knowledge of and perceptions of multi-storey wood buildings in seven European countries, NOFOBE I survey. In 2020 we planned and prepared for a NOFOBE final conference. Due to the developments of the Covid-19-pandemic this was on short notice (<6 weeks) cancelled as an arrangement with physical participation and changed to a webinar organised by NOFOBE and Faculty of Environmental Sciences and Natural Resource Management, NMBU. This reduced the costs radically, thus freed up resources and the remaining funding was allocated to do a second survey (NOFOBE II) as a follow-up of the NOFOBE I survey.

Covid-19 also reduced the practical opportunities for short-term scientific visits. Part of the funds originally budgeted for supporting the research visits were readdressed to the NOFOBE II survey. Physical researcher exchange was thus flexibly transformed to intensive online collaboration that yielded tangible outputs. The NOFOBE-partners greatly appreciate the flexibility shown by SNS to extend the project into 2021 giving time to plan, reallocate, and finalise the project.

5. Published outputs achieved as a consequence of the project (peer-reviewed articles, other publications)

Publications falling within the general objectives of NOFOBE:

1. Hans Fredrik Hoen, Introduction to special issue on Scandinavian Society of Forest Economics (SSFE) Biennial meeting 2016, *Journal of Forest Economics*, Volume 31, 2018, Pages 1-2, ISSN 1104-6899, <https://www.sciencedirect.com/science/article/pii/S1104689918300072>
2. Anne Toppinen, Axel Röhr, Satu Pätäri, Katja Lähtinen, Ritva Toivonen, The future of wooden multistorey construction in the forest bioeconomy – A Delphi study from Finland and Sweden, *Journal of Forest Economics*, Volume 31, 2018, Pages 3-10, ISSN 1104-6899, <https://www.sciencedirect.com/science/article/pii/S1104689916300952>.
3. Elias Hurmekoski and Hanne K. Sjølie (2018), "Comparing forest sector modelling and qualitative foresight analysis: Cases on wood products industry", *Journal of Forest Economics*: Vol. 31: No. 1, pp 11-16. <https://www.sciencedirect.com/science/article/pii/S1104689916301027>.
4. Päivi Pelli, Services and industrial development: analysis of industrial policy, trends and issues for the forest-based sector, *Journal of Forest Economics*, Volume 31, 2018, Pages 17-26, ISSN 1104-6899, <https://www.sciencedirect.com/science/article/pii/S1104689916301027>.
5. Richard J. Brazee, Impacts of declining discount rates on optimal harvest age and land expectation values, *Journal of Forest Economics*, Volume 31, 2018, Pages 27-38, ISSN 1104-6899, <https://www.sciencedirect.com/science/article/pii/S1104689916300964>.
6. Colin Price, Declining discount rate and the social cost of carbon: Forestry consequences, *Journal of Forest Economics*, Volume 31, 2018, Pages 39-45, ISSN 1104-6899, <https://www.sciencedirect.com/science/article/pii/S1104689916300988>.

Publications based on surveys on multi-storey wood construction (NOFOBE I and II):

1. Noora Viholainen, Florencia Franzini, Katja Lähtinen, Anders Q. Nyrud, Camilla Widmark, Hans Fredrik Hoen, and Anne Toppinen. Citizen views on wood as a construction material: results from seven European countries. *Canadian Journal of Forest Research*. 51(5): 647-659. <https://doi.org/10.1139/cjfr-2020-0274>
2. Helto, K.M.Aa., Nyrud, A.Q., Hoen, H.F., Roos, A., Aguilar, F.X., Lähtinen, K., Viholainen, N., Berghäll, S., Toppinen, A., Thorsen, B.J., Kniivilä, M., Haapala, A., Hurmekoski, E., and Hujala, T. 2020-submitted And in review Citizens' knowledge of and perceptions of multi-storey wood buildings in seven European countries. *Scandinavian Journal of Forest Research*. Manuscript-id: SFOR-2020-0102
3. Lähtinen K., Häyrynen L., Roos A., Toppinen A., Aguilar Cabezas F.X., Thorsen B.J., Hujala T., Nyrud A.Q., Hoen H.F. (2021). Consumer housing values and prejudices against living in wooden homes in the Nordic region. *Silva Fennica* vol. 55 no. 2 article id 10503. <https://doi.org/10.14214/sf.10503>
4. Francisco X Aguilar Cabezas, Anders Roos, Antti Haapala, Katja Lähtinen Päivikki, Matleena Kniivilä and Hans Fredrik Hoen 2021-submitted Dweller preferences for wood as a load-bearing material in residential buildings. *Journal of Forest Economics*. Manuscript-id: MS JFE_MS 116
5. Anders Roos, Hans-Fredrik Hoen, Francisco X. Aguilar, Tomas Nordd, Katja Lähtinen, Antti Haapala, Elias Hurmekoski, Jaakko Jussila, Emil Nagya, Cecilia Mark-Herberta, Anne Toppinen, Ritva Toivonen and Liina Häyrynen. 2022. Housing priorities and views on timber construction – a study on Finnish and Swedish residents for multistorey buildings. In prep – submission to *Wood Material Science and Engineering*.
6. Vehola, A., Hurmekoski, E., Lähtinen, K., Ruokamo, E., Roos, A., Toivonen, R., Toppinen, A. 2022. Endless November? Citizen beliefs concerning wood as a construction material under extreme weather events. Submitted to *Climatic Change*.
7. Wallius, V., Kunttu, J., Hujala, T., Hurmekoski, E. 2022. Demographic consumer profiles for wood-frame multi-storey building and their reaction to information on fire safety. Manuscript under preparation.
8. Hans Fredrik Hoen, Anders Qvale Nyrud, Anders Roos, Tomas Nord, Bo Jellesmark Thorsen, Elias Hurmekoski, Noora Viholainen, Katja Lähtinen, Anne Toppinen, Teppo Hujala . 2022. Data Note: Consumer survey data on knowledge, experience, and perceptions on wood construction and tallwood buildings in seven European countries. Manuscript under preparation.
9. Anders Roos, Ritva Toivonen, Emil Nagya, Anne Toppinen, Jaakko Jussila, Elias Hurmekoski, Lina Häyrynen, Cecilia Mark-Herbert. 2022. Beliefs on perceived environmental impacts of wood construction. Manuscript under preparation.

6. Other practical outputs of the project (websites, policy recommendations, conferences, scientific meetings, large-scale project applications, research training etc.)

Oral presentation:

1. Invited presentation "NOFOBE Tall wood buildings – a multi-country survey. Allmenhetens holdninger til høyhus i tre og tre som byggemateriale" at the conference Skog&Tre, Gardermoen, Norway 23rd of May, 2019. This is a main national conference for the forest-based sector in Norway with about 400 participants. Hans Fredrik Hoen and Kaja M. Aa. Heltorp.
2. Presentation "To build with wood or not to build? citizen views on wood as a construction material" at the 2019 Corporate Responsibility Research Conference arranged in Tampere, Finland (<https://www.crrconference.org/previous-conferences/crrc-2019/>) September 11th-13th. Noora Miilumäki et al.
3. Presentation «Interiørtre – effekter og erfaringer» at conference: Et nytt bærekraftig hovedsykehus for Innlandet, Brumunddal 31. november 2019, 70 participants. Anders Qvale Nyrud.
4. Presentation "Modern wood construction: enhancing sustainability in the built environment" at Wood Living Helsinki, 3rd of December, 2019, about 100 participants. Anders Qvale Nyrud.
5. Presentation «Status for treteknologi ved NMBU» at Treindustriens tekniske forening julemøte, Olavsgård, 12th of December, 2019. About 120 participants. Anders Qvale Nyrud
6. Presentation "Knowledge of and perceptions of multi-storey timber buildings in seven european countries", World Conference on Timber Engineering, Santiago Chile 9th – 12th of August, 2021. Online presentation. A.Q. Nyrud and H.F. Hoen.

Conference proceedings:

1. Hans Fredrik Hoen, Cathrine Glosli (eds.) 2017. Proceedings from joint seminar arranged by NB-NORD and NOFOBE Lappeenranta, Finland, June, 2017. [Scandinavian Forest Economics 47](#)
2. Several of the participants in the NOFOBE-network contributed to the proceedings from the Biennial meetings of the Scandinavian Society of Forest Economics in 2016, 2018 and 2020 respectively, published in the series Scandinavian Forest Economics and available at: <https://www.ssfe-network.org/publications/>

7. How and within which areas was the project beneficial for the Nordic countries?

1. Intensified research co-operation across borders
2. Exclusive data and analysis on the public perceptions towards high rise wood construction in the Nordic countries and main export regions
3. Nordic networking for early-stage researchers (several of whom in this project were female)
4. Awareness raising and outreach to the public and policymakers on aspects of high rise wood construction, contributing to science-based dialogue within policy, businesses, and consumption

Participation

8. Number of participants

We list members of the NOFOBE-core-group and in parenthesis participants in seminars and conferences with NOFOBE involved as organiser.

Country	Young researchers / PhD students	Senior researchers	Stakeholders	Others (specify)	Gender			Total
					Women	Men	Other	
Denmark	- (~5)	2 (~10)			-	2		2 (~15)
Finland	4 (~25)	7 (~20)			7	4		11 (~45)
Iceland	-	-			-	-		
Norway	1 (~10)	2 (~10)			1	2		3 (~20)
Sweden	2 (~10)	3 (~10)			2	3		5 (~20)
Other (Austria, Germany, Indonesia, Romania, UK,US)	- (~25)	- (~15)						- (~40)
Total	7 (~75)	14 (~65)			10	11		21 (~140)

9. List the participating institutes/sectors

1. Faculty of Environmental Sciences and Natural Resource Management, Norwegian University of Life Sciences, Norway
2. Department of Food and Resource Economics, University of Copenhagen, Denmark
3. Department of Forest Economics, Swedish University of Agricultural Sciences, Sweden
4. Institutionen för ekonomisk och industriell utveckling (IEI), Linköpings Universitet, Sweden
5. Department of Forest Sciences, Faculty of Agriculture and Forestry, University of Helsinki, Finland
6. School of Forest Sciences, University of Eastern Finland, Finland
7. European Forest Institute-Headquarter, Joensuu, Finland
8. Natural Resources Institute Finland, LUKE, Finland

Economic report

10. Received grant from SNS in total (SEK):
2.250.000

11. Transfer of SNS funds to project partners

Country	Partner organization	Sum (SEK)
Denmark		
Finland	UNIVERSITY OF HELSINKI	179 824,50
Sweden	EFI EUROPEAN FOREST INSTITUTE	55 001,53
Norway	UNIVERSITY OF EASTERN FINLAND	37 737,26
Iceland	Luke Natural Resources Institute Finland Luonnonvarakeskus	20 533,87
Other countries (specify)	SLU SWEDISH UNIV. OF AGRICULTURAL SCIENCES	20 790,56
Total SUM		313 887,72

12. Costs

	SNS funding	External funds*	Total*
Travel and hotel	93 330,09		93 330,09
Meeting costs	44 784,41		44 784,41
Consumables	26 305,48		26 305,48
Salary	825 190,15		825 190,15
Communication	0,00		0,00
Other costs (specify) Surveys, NOFOBE I and II	946 502,15		946 502,15
Total SUM (SEK)	1 936 112,28		1 936 112,28

* If possible, provide details otherwise summarize the total sum for external funds and total.

13. Economic result (deficit or surplus):
0

Optional: Comments to the economic reporting:

14. Submit a policy brief as a separate document. Provide pictures (size at least 500x500 pixels and resolution at least 72 pixels) in the policy brief as well as separate files (.jpg). Include caption to each picture, and the name of photographer.

Final report for Centre of Advanced Research (CAR)

I hereby declare that the above statements are true to the best of my knowledge

Main applicant's signature, place and date



Hans Fredrik Hoen

NMBU

28/02/2022

.....
(Signature)

.....
(Institution)

.....
(Day / Month / Year)

Signature of the head of the main applicant's research institution



NMBU

28/02/2022

.....
(Signature)

.....
(Institution)

.....
(Day / Month / Year)

Jan Vermaat, research-dean

.....
(Printed name, function)

Second applicant's signature, place and date



University of Helsinki

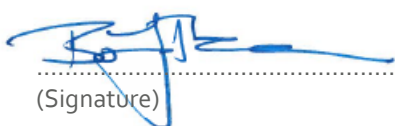
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(Institution)

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(Day / Month / Year)

Third applicant's signature, place and date



University of Copenhagen

28/02/2022

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(Signature)

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