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Case study in Finland

Forest use for bioenergy in North Karelia

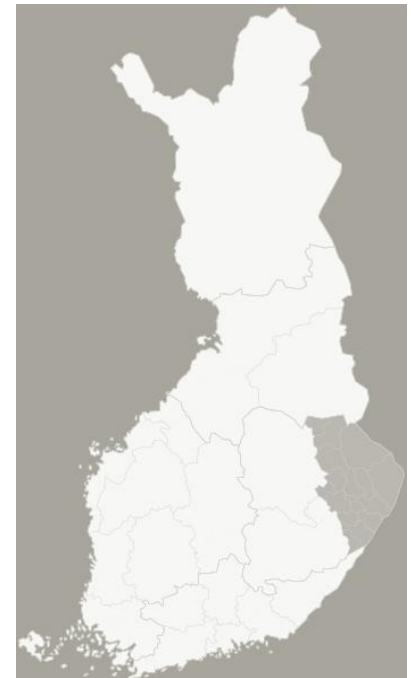
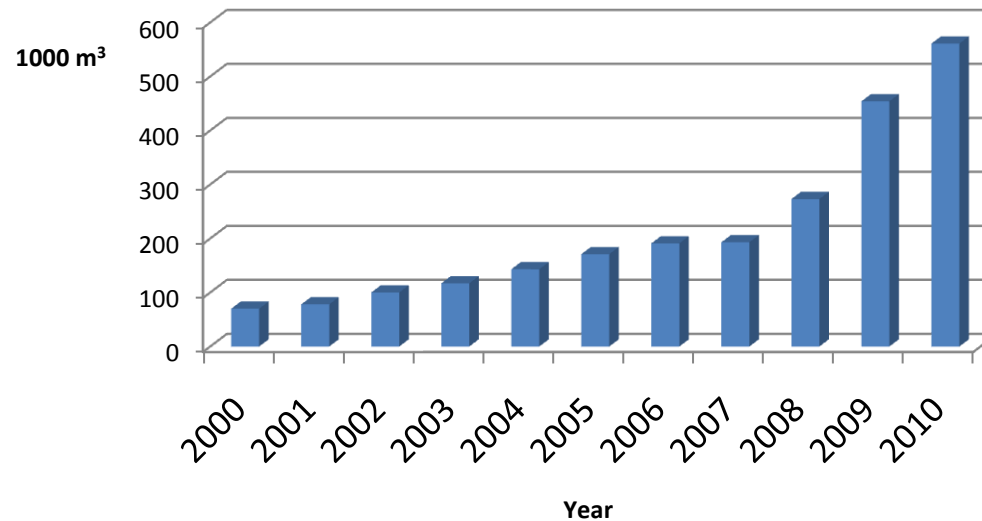


Forest use for bio-energy in North Karelia

North Karelia is a pioneer in forest bio-energy utilization in Finland

- nearly 90 % of the land area is forested land
- wood is the main energy source in the region

Use of forest wood chips in North Karelia





How we used ToSIA in North Karelia?

- To assess impacts of increasing production and use of forest wood chips for heating
- Comparison of heat production in small and medium scale heating plants
- Scenario “Heating oil free North Karelia”
- Multi-criteria-analysis (MCA): to support the Regional Forestry Council to choose suitable option for using forests of North Karelia



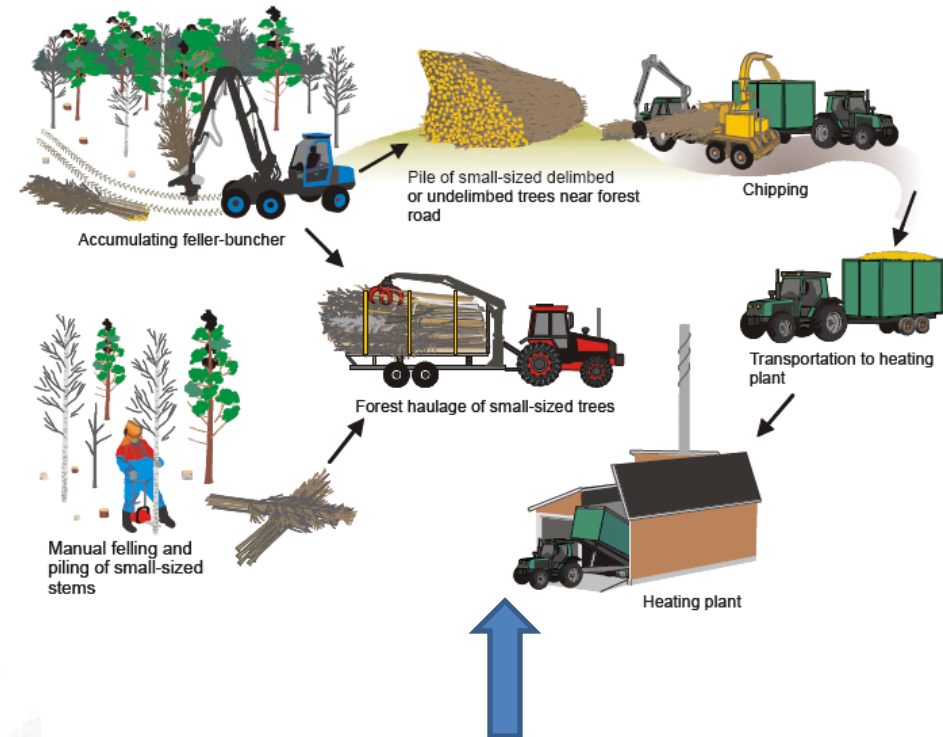
Heat production in small and medium scale

- Two example cases of forest bio-energy utilization for heating
 - Tuupovaara Energy Co-operative
small scale district heating plant
 - Outokumpu Energy
medium scale district heating plant



Forest fuel supply chains

Medium scale heating plant
Outokumpu

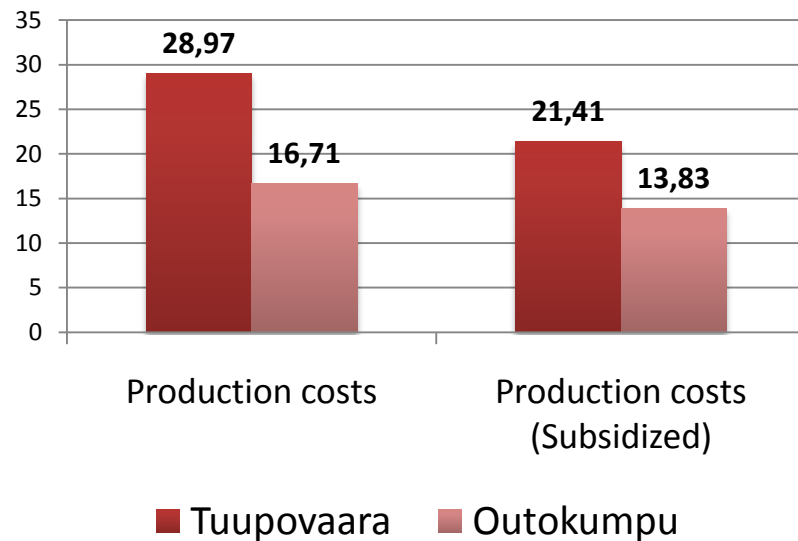


Small scale heating plant
Tuupovaara

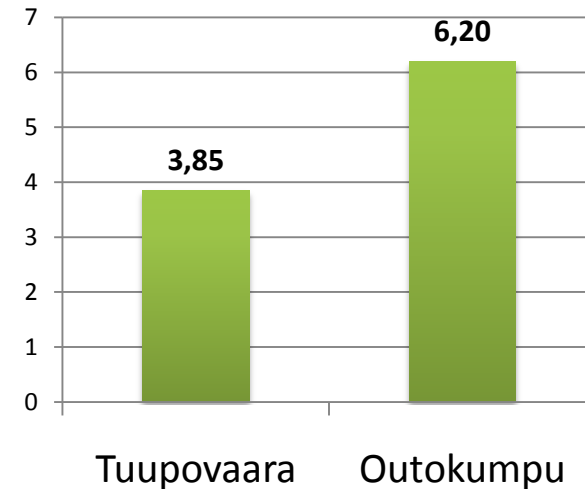
Kallio & Leinonen 2005

Results

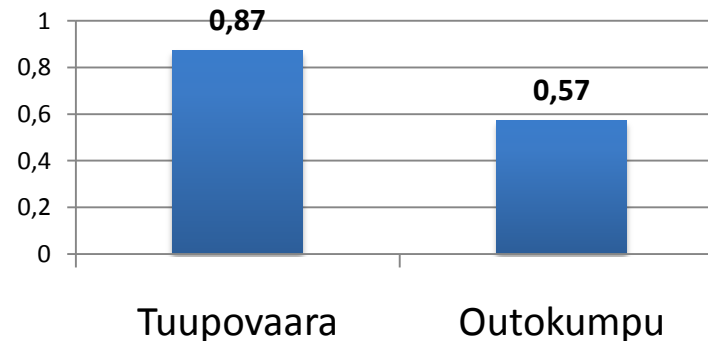
Production costs, €/MWh



GHG emissions from machinery, kg CO₂ eq./MWh



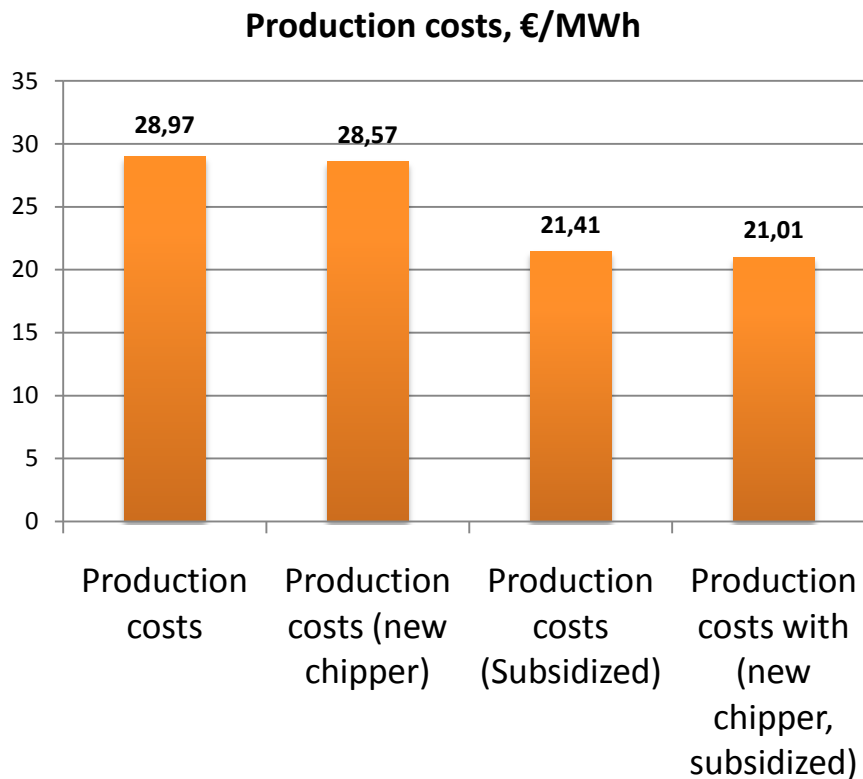
Employment, person a/1000 MWh



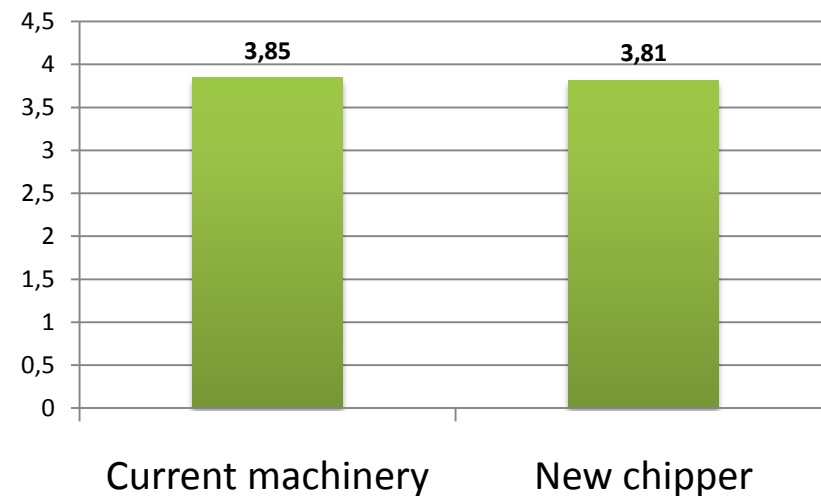


Scenario of the small heating plant

What if we have more efficient chipper?



Greenhouse gas emissions from machinery, kg CO₂ eq./MWh

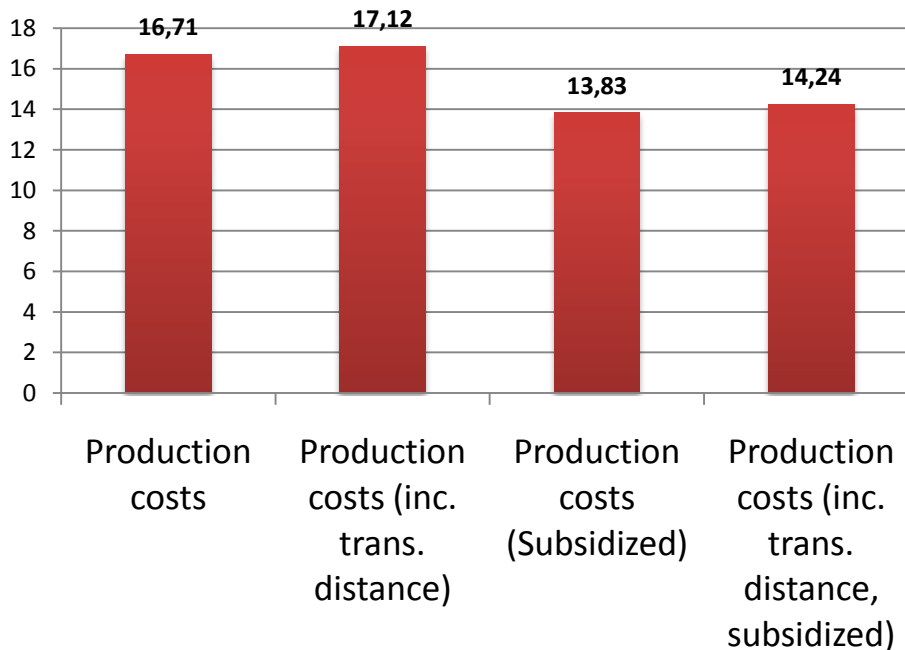




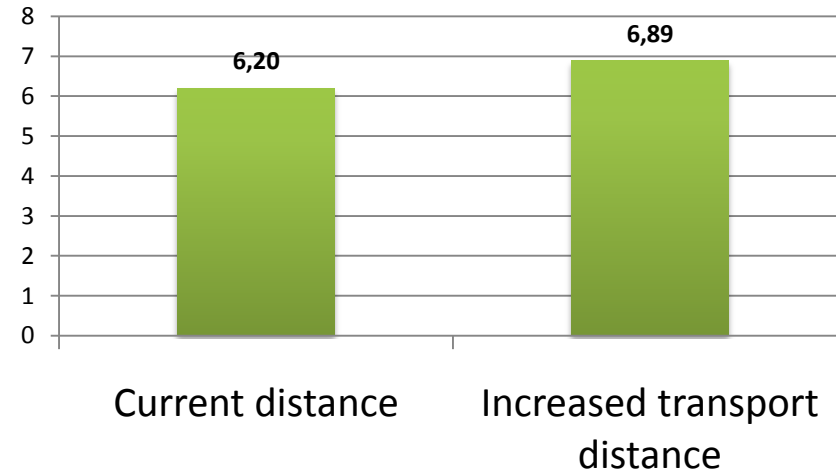
Scenario for medium scale heating plant

What if we need to increase transport distance?

Production costs, €/MWh



GHG emissions from machinery, kg CO₂ eq./MWh





The frame of the regional development strategies

International environmental conventions

UN Framework Convention on Climate Change and Kyoto Protocol

European Union

Strategy on Climate Change

Lisbon strategy

National programmes and strategies (Finland)

National Forest Programme

Long-term Climate and Energy Strategy

Regional programmes and strategies (North Karelia)

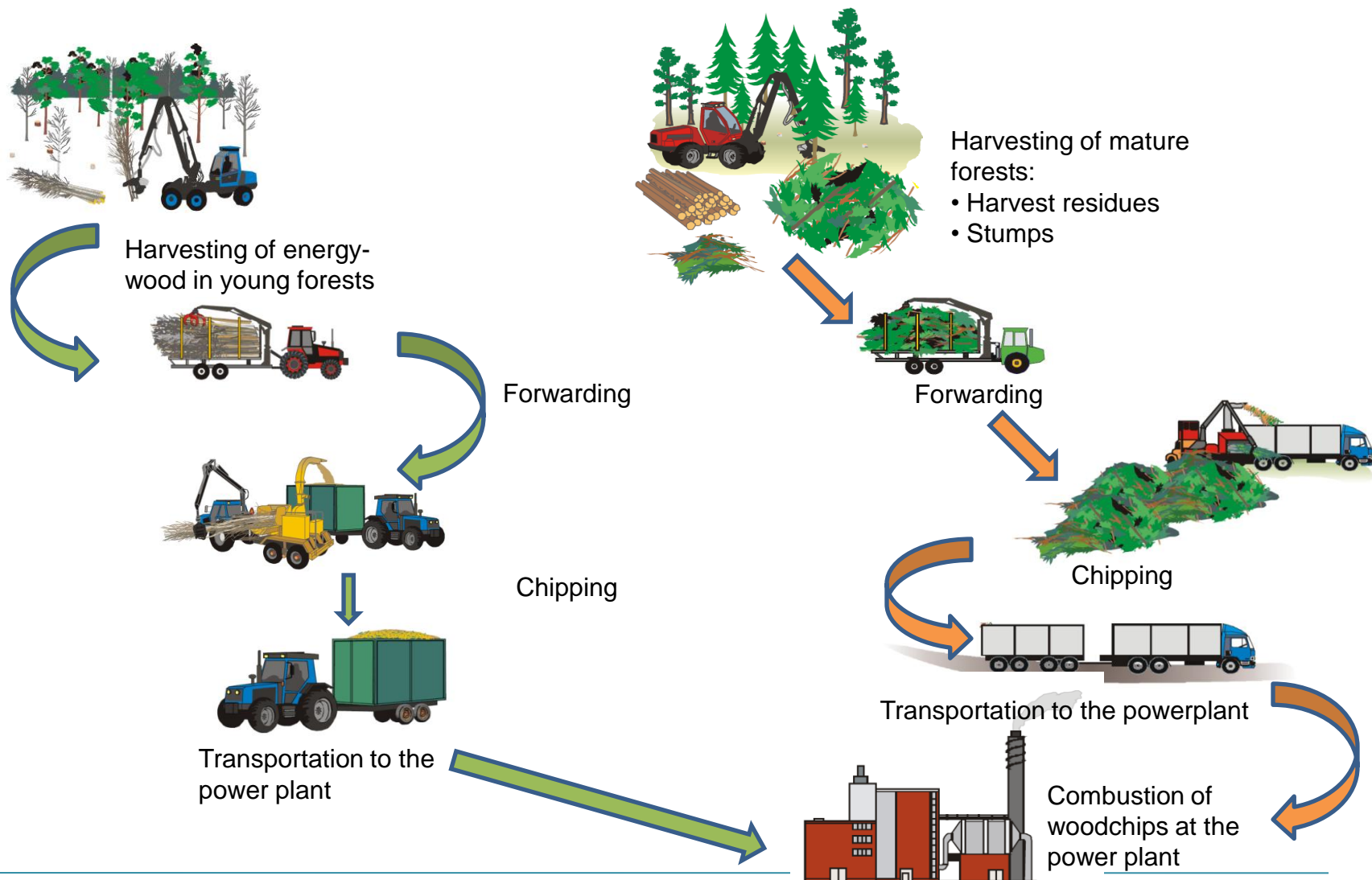
Regional Plan

Regional Strategic Programme

Regional Forest Programme

Climate and Energy Programme

Forest wood chip production in North Karelia





Regional Forest Programme

- Define strategy for forestry, utilisation and protection of forests in the Forestry Centre territory

Regional Forestry Council (RFC)

- Developing sustainable forestry in the region
- Participating in the preparation of the regional forest programme and monitoring its implementation
- Consist of key forest sector actors and stakeholders – fine possibility for multi-stakeholder dialogue



ToSIA application with RFC

- To compare the scenario alternatives in terms of six indicators
- Three future alternatives for the use of North Karelian forests were evaluated (cutting levels) with multi-criteria-analysis
- The scenario aiming for the max economic profit received the highest score among the stakeholders



Northern ToSIA

Monikriteerianalyysin tuloksia

• Kunkin tulevaisuuden toimintajavaihtoehdon keskimääräinen kestävyysvaikutusluokitus sekä pienin ja suurin arvo:

	NTN, 5 %	SK	TH
SIR, keskiarvo	0.531	0.476	0.493
Pienin arvo	0.485	0.466	0.450
Suurin arvo	0.580	0.487	0.538

Logos: Northern Periphery Programme, European Union, ToSIA, EFI

ToSIA application with RFC

- Results triggered an active debate about methodological and technical issues of ToSIA and MCA
- Critical points were scenario setup and available indicator information





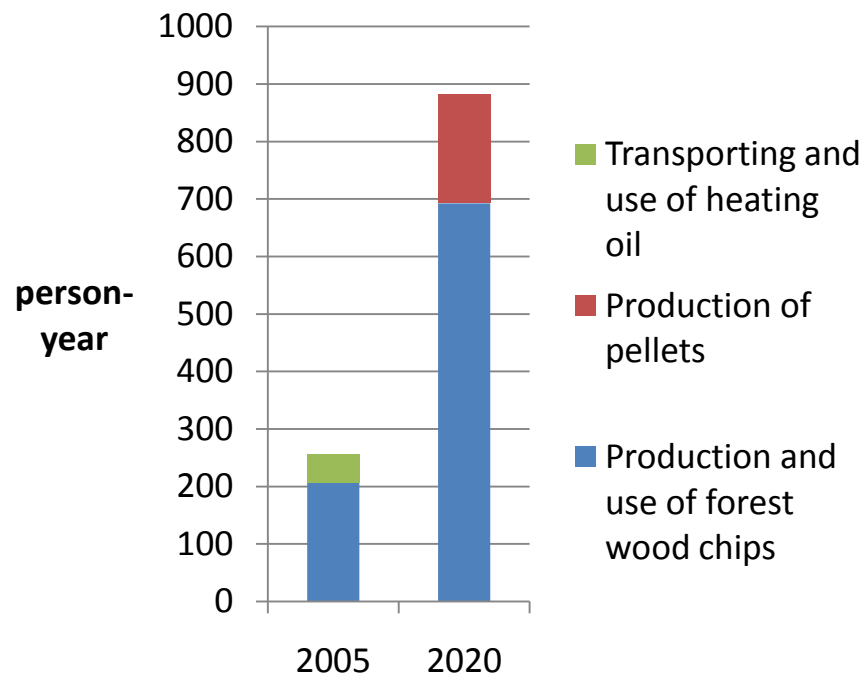
Regional Climate and Energy Programme

- Programme started 2010, will be finished and published autumn 2011
- Energy includes renewable energy production and use as well as energy effectiveness and savings
- Participatory open process 2010 – 2011 in programme planning
 - Steering group
 - 4 Working groups together with 50 experts
 - One group was Energy production and use & Forestry
 - SOVA group handling (impact assessment group)

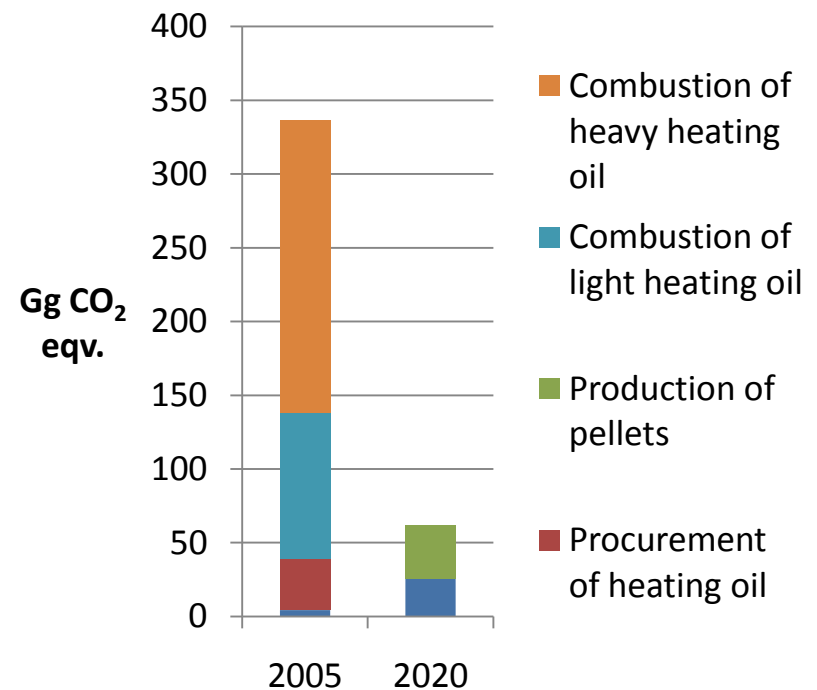


Heating oil free region – what it means?

Impact on employment in North Karelia



Impact on greenhouse gas emissions of fossil fuels





Conclusions

- Transparency and the structured framework as such were seen to be positive and useful.
- The discussion process and better understanding of different perspectives on forest-wood-chain sustainability between stakeholders were positive lessons learnt.
- FWC and indicator data make research knowledge visible to regional decision making.

Thank you!



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