

# Riga Technical University

## 2017-01-24

- Linnaeus University
- Faculty of Technology
- Dep. of Forestry and Wood Technology

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Småland has a large part  
of the forests in Sweden



# Linnaeus University in numbers

- 42 000 students
- 2 000 employees
- 1 500 MSEK turnover
- 350 MSEK research/doctoral education
- Ca 150 educational programmes and 3 000 single courses



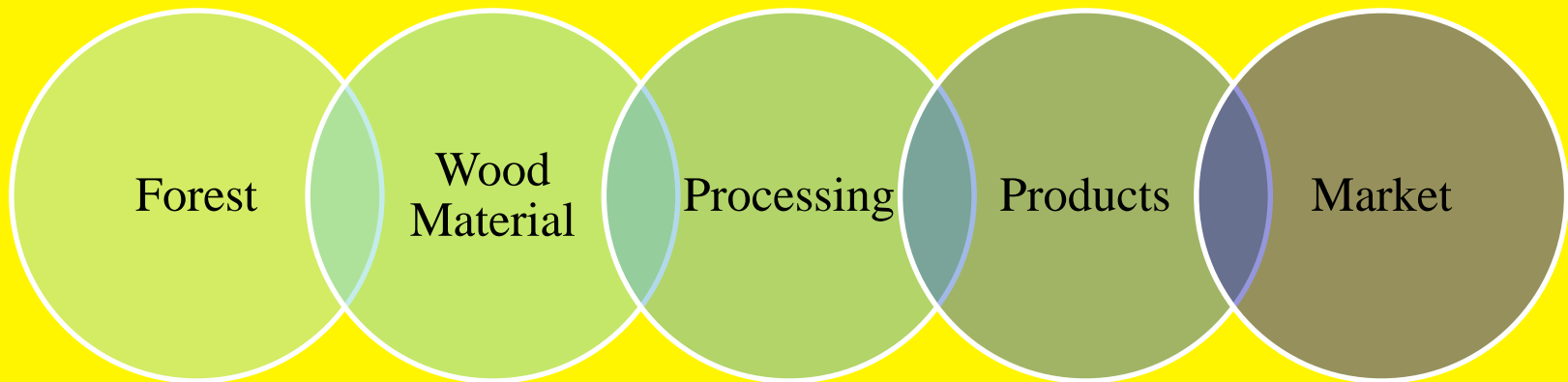




# Sustainable Small-scale Forestry

Since 2001 ca 3500 private forest owners have attended. 50% women.

# Research and education in the forestry- and wood production chain



Unique thematic approach without counterpart in Sweden



# Political and legal framework of the Swedish Bioenergy sector

RIGA 2017-01-24

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# Disposition

Before tax...

Swedish taxation 1950-2000

Energy supply and use in Sweden

Biofuels, Forest residues, etc

Biofuels 1917 – 2017

Strategical and operational ideas

# Swedish taxation on work and energy

1950s – 2000s taxation on work increased from 10 to 44% (VAT incl) of GDP  
incentive for increased productivity

Energy taxes steady at 7%



Could taxation lead to better environment and resource management?



Tax exchange?

More jobs?

The overall effect is negligible.





# Växjö 1970s

Convert a big heating plant to using domestically produced biofuel

Pioneer effort - SÖDRA was involved in order to supply the plant

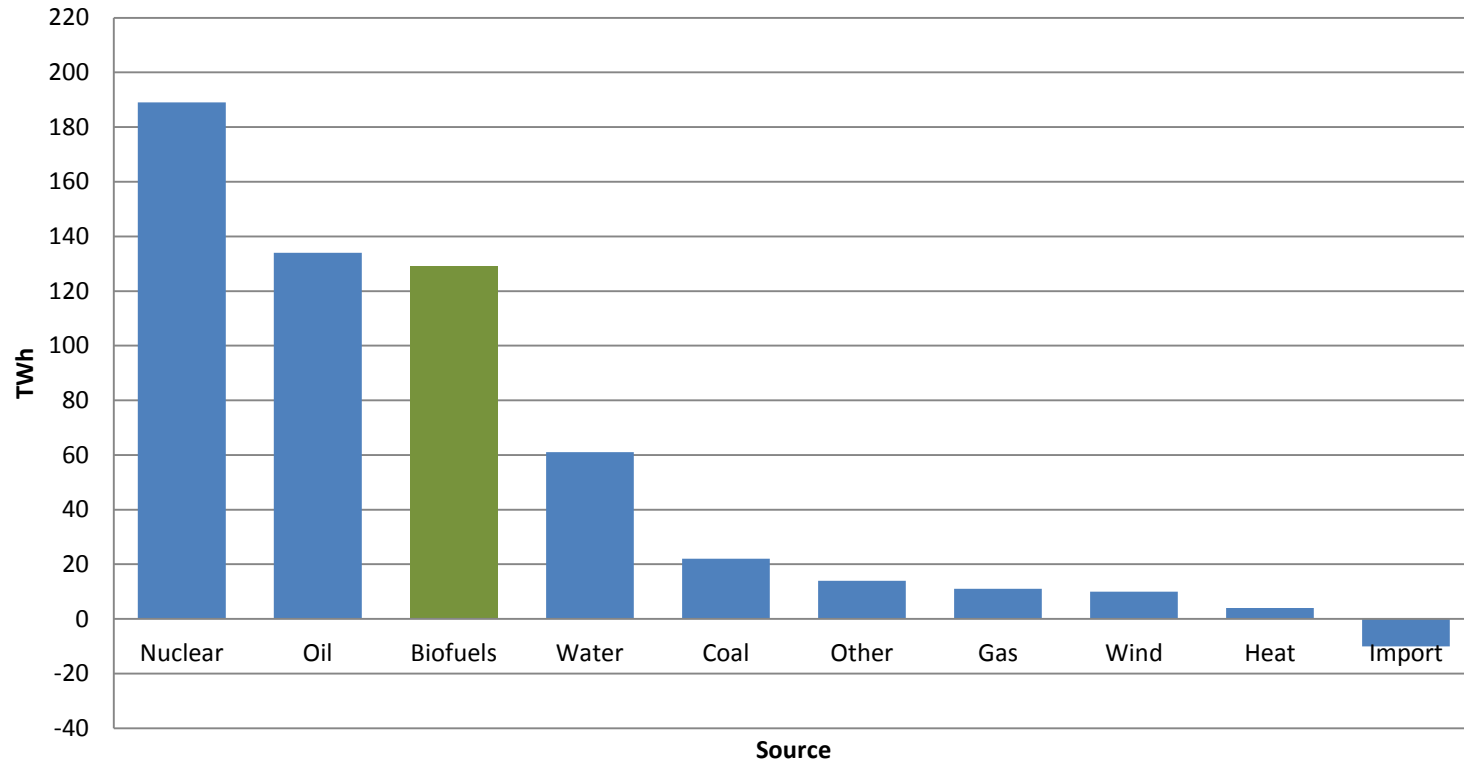


# 1990-today

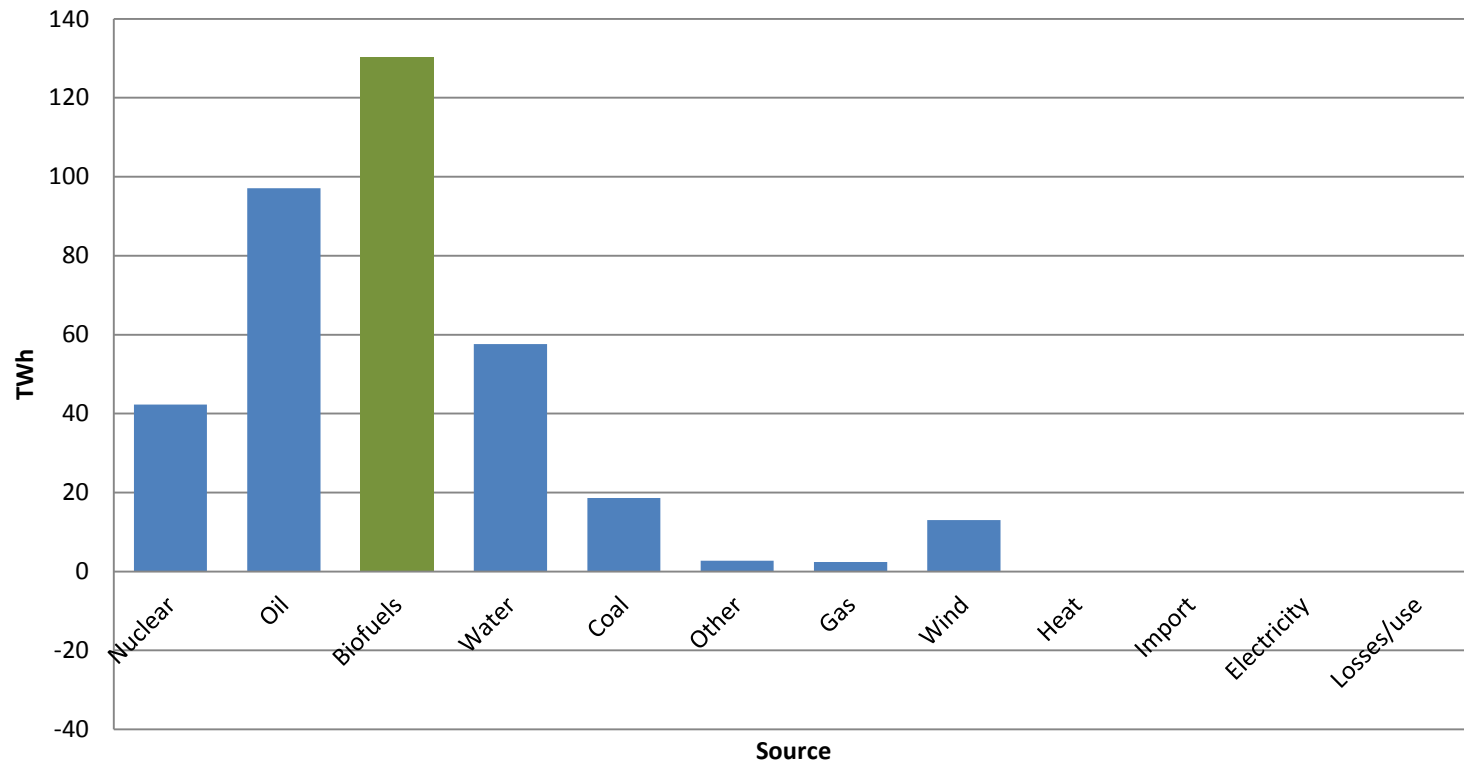
- 1990-t Tax on CO<sub>2</sub> + raised energy tax. Decreased tax on income.  
(Biofuels excepted).
- 1998 Green tax exchange politically confirmed
- 2000 Consumption tax on electricity, nuclear electricity and energy tax on diesel (1,7 billions SEK).
- 2001 Tax on fossil fuels and electricity increased with 3.3 billions SEK
- 2003 Electricity certificates
- 2005 Emissions trading system (EU)
- 2015 Energy mapping every 4th year (companies)
- 2015 Tax incentive for Microproduction of renewable electricity
- 2017 Energy commission  
Collection of facts – Analysis – Political agreement (2050)



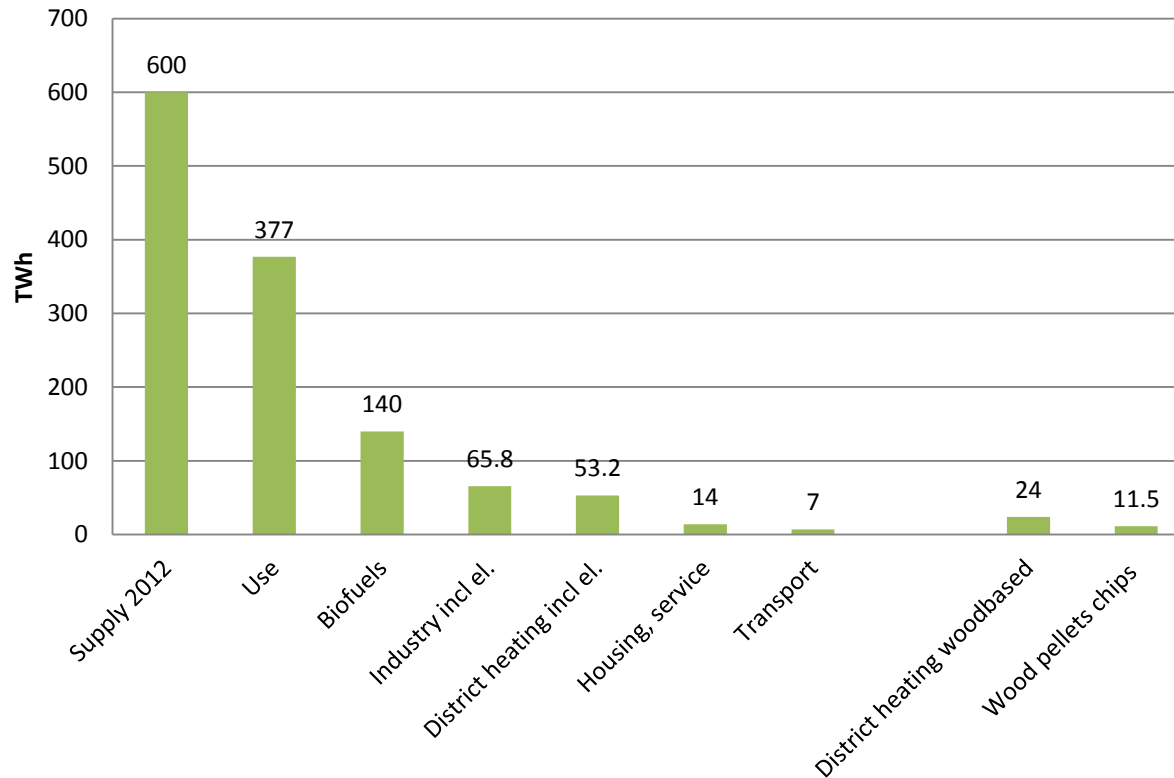
## Energy supply in Sweden 2013



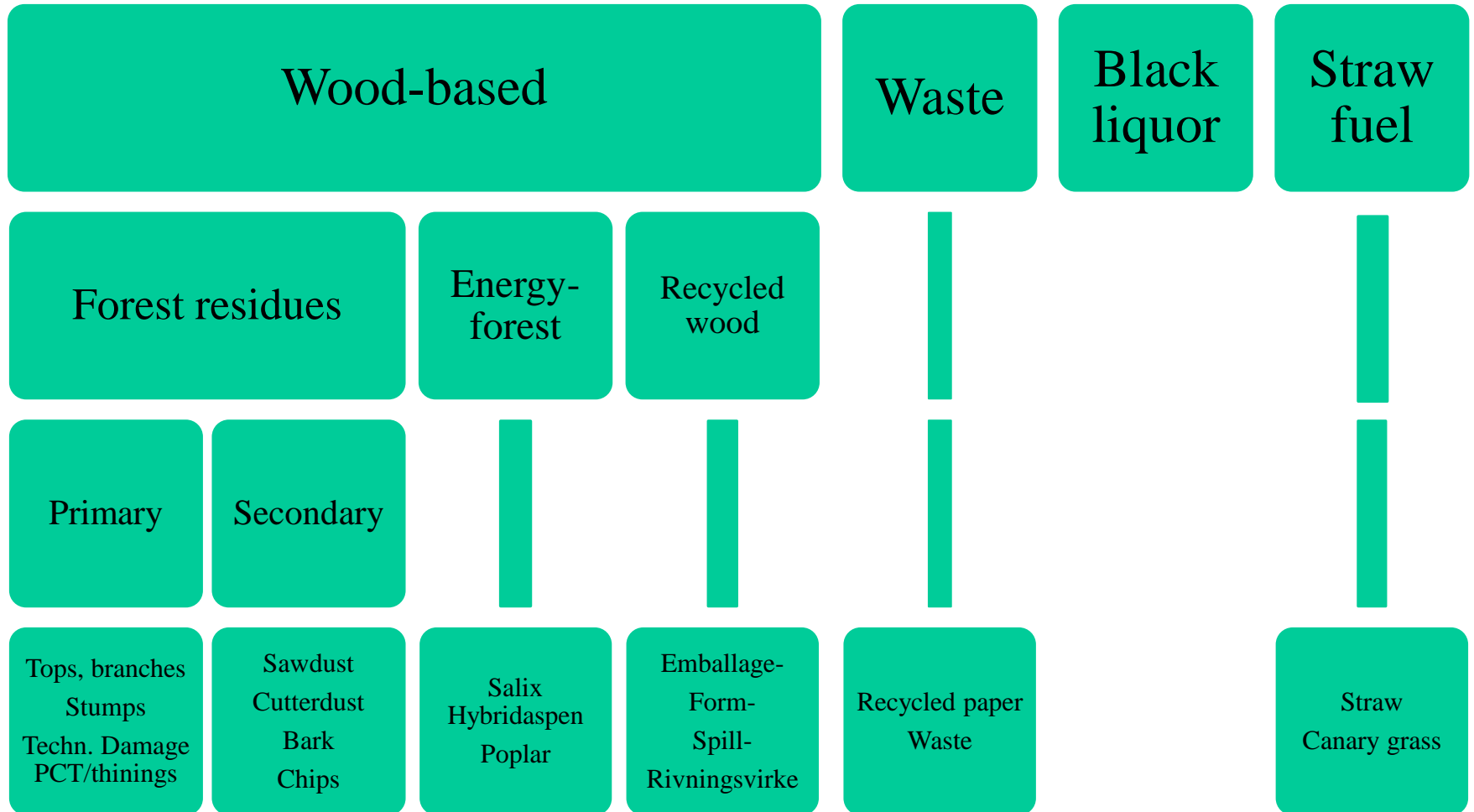
## Energy use (losses excluded) in Sweden 2013



## Energy total supply and use and biofuels 2012



# Biofuels





# Development of the Swedish forest fuels sector

1917



Source: Forest library, Umeå

2017



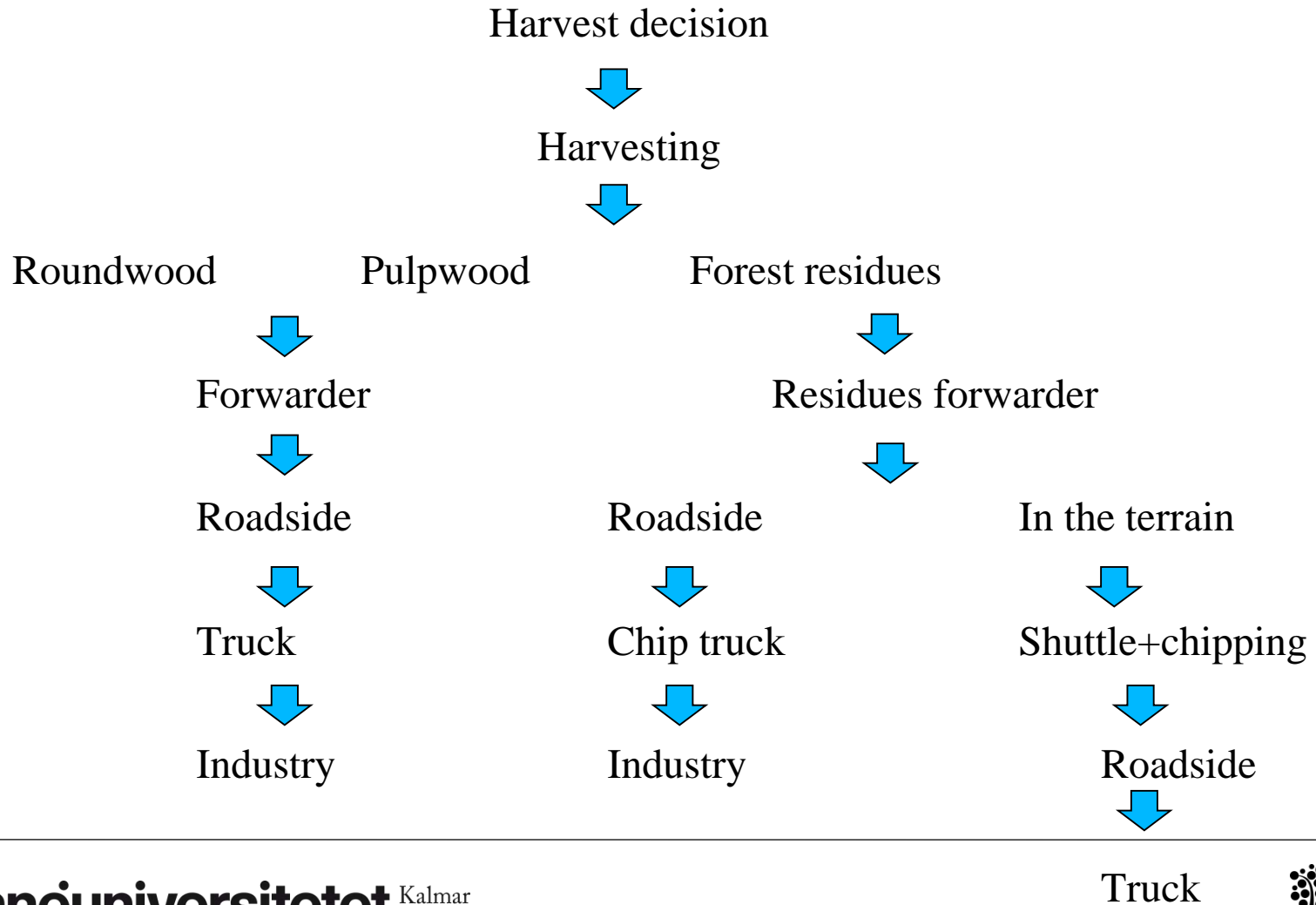
2017

Huge variability:

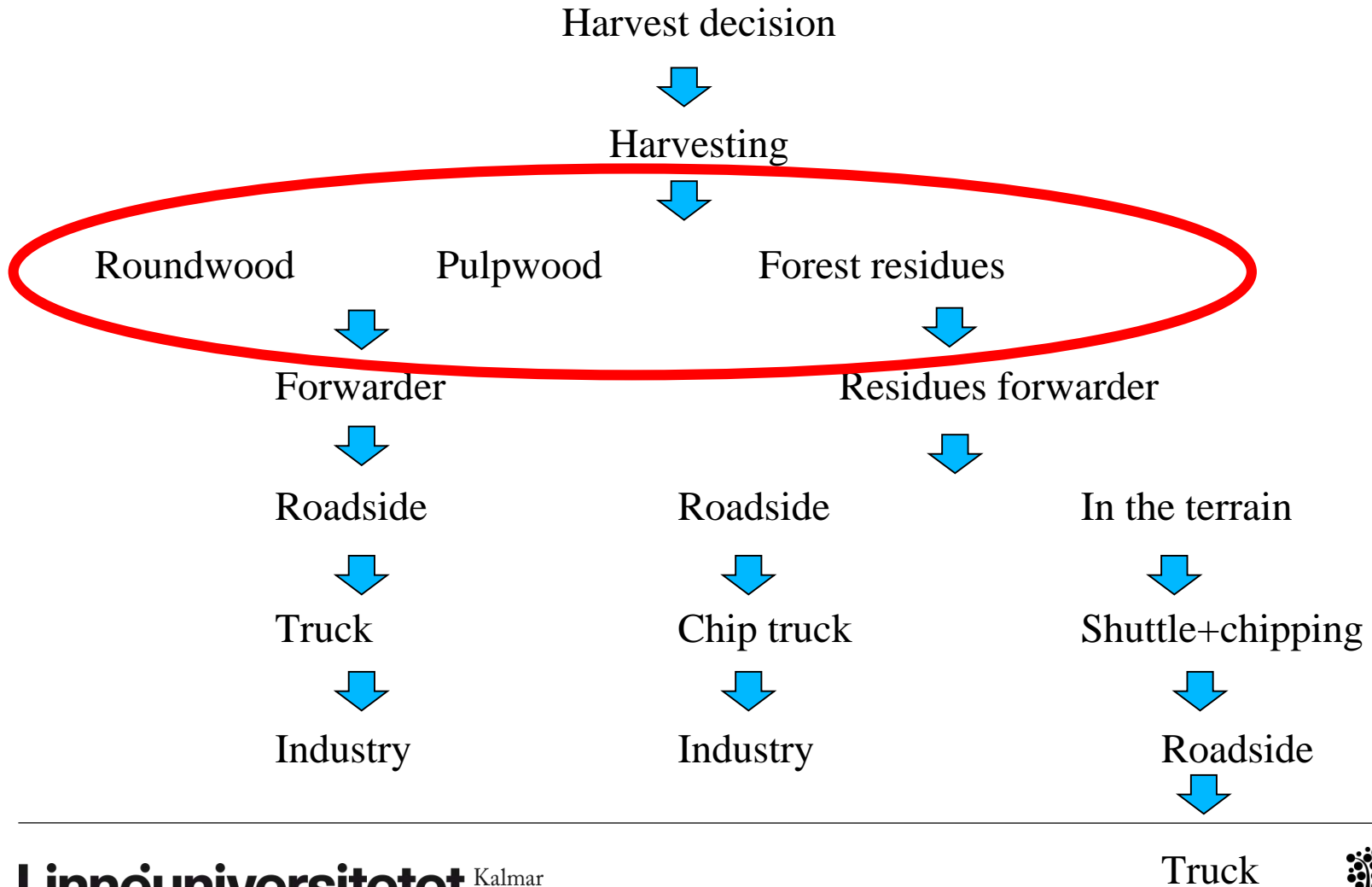
2008 55 000 ha  
2012 80 000 ha



# Forest residues logistics



# Forest residues logistics



# Harvester

Forest residues adapted site

Lumber, pulpwood, forest residues along strip road

No undergrowth

Proper landing sites for trucks

Use lumber and pulpwood to build forest residue stacks

Go back and forth in order to build big stacks





# Ideas how to develop the forest residues sector

General instruments for energy policies to promote renewables - stakeholders decide what to put efforts in

EU Feed-In tariffs high long-term support- increased costs

Harvesting operations

Central-placed forest residues (unknown, driver-dependent)

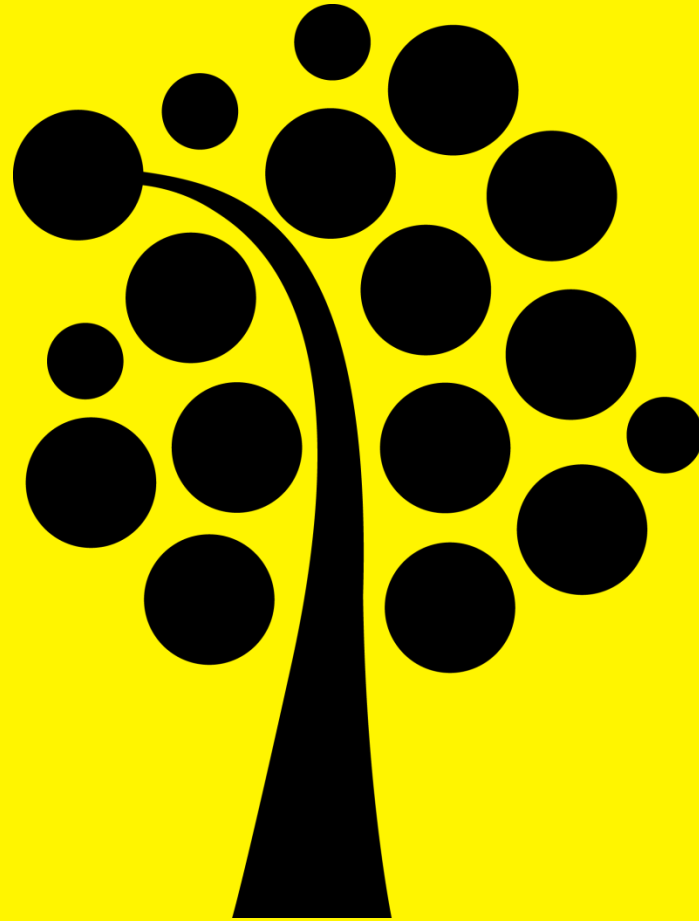
Changing forest residues (3-15% gains)

Using green and brown forest residues

Demands from the heating industry

The same entrepreneur from forwarding to heating plant





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