

Firewood production and business models

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Business from technology

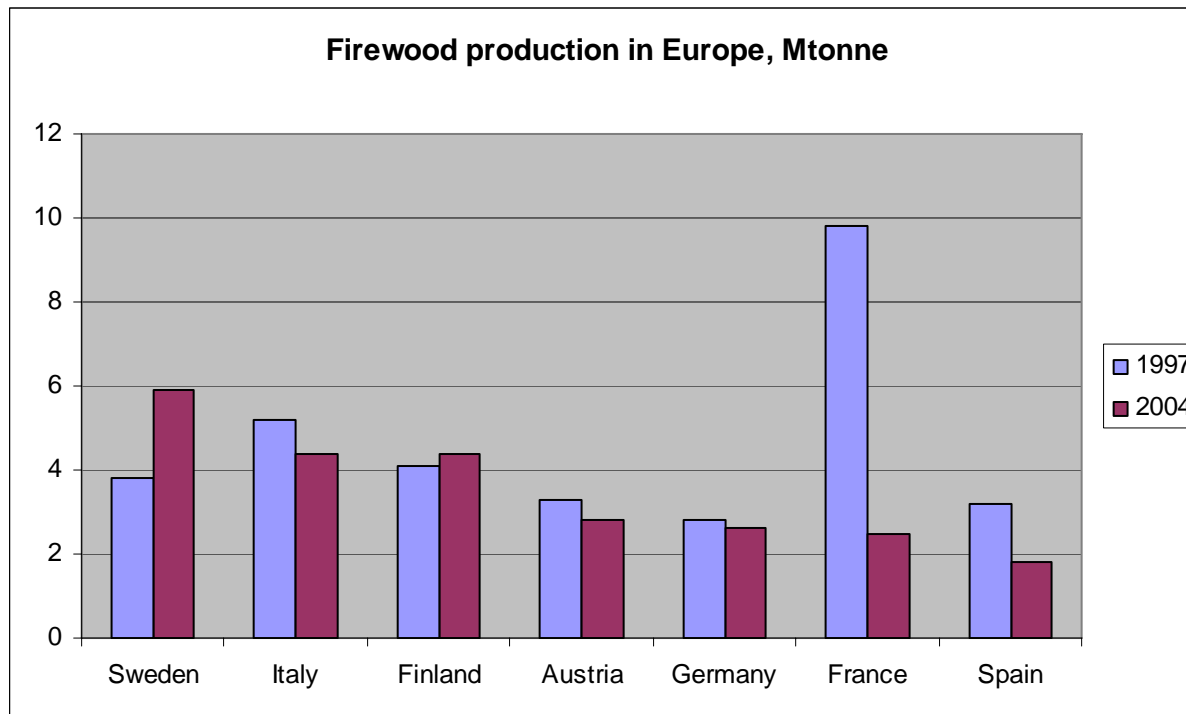
Biomass (wood) energy consumption in Europe

Raw material	Mtoe	TWh
firewood	15.9	184.9 (92 Mm ³ or 65 Mtonne)
by-products	11.7	136.1
black liquor	12	139.6
bark	5	58.1
pellets	1.3	15.1
biogas	0.4	4.7
chips from forest residues	2	23.3
Total	48.3	561.7

Source: AEBIOM 2004

1 Mtoe = 11.63 TWh; 5.8 Msolid-m³ of wood

Production volumes of firewood in Europe



Source: FAOSTAT 2004

Firewood consumption in Finland

- 6.1 million solid-m³ (4.3 Mtonne) of firewood is used for heating in Finland (ca. 55 Mm³ harvested for industry)
- 13% of energy consumption of houses and other buildings
- Most firewood burned in stoves, furnaces and fireplaces
- 60 M€ in firewood production business (fireplaces etc. not included)



Combustion devices; fireplaces

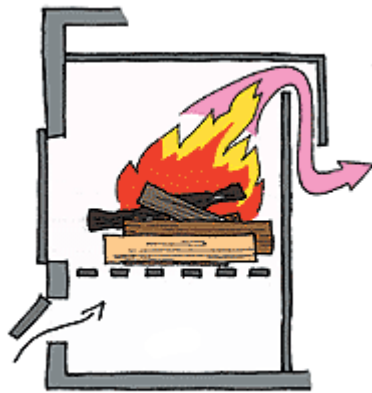
- 2.2 million heated fireplaces total (compared to 5.3 M people)
 - 1.2 M in single houses
 - 0.8 M in summer cottages
 - 0.3 M in other buildings
- 1.5 million sauna stoves
- Important business
 - 100,000 fireplaces
 - 60,000 sauna stoves sold annually



Heating principle of a heat-retaining stove (Courtesy of Nunna Uuni Oy)

Combustion devices; boilers

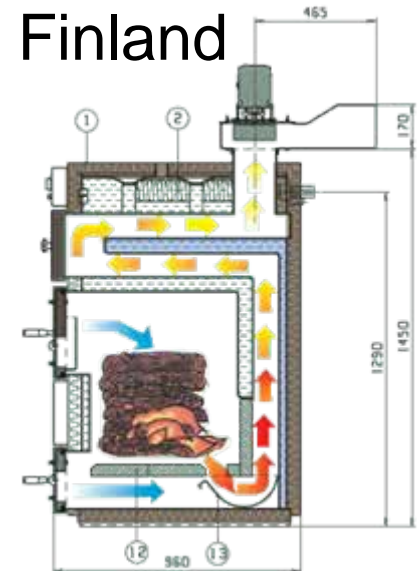
Heating principles of different boilers used in Finland



Over-fire boiler

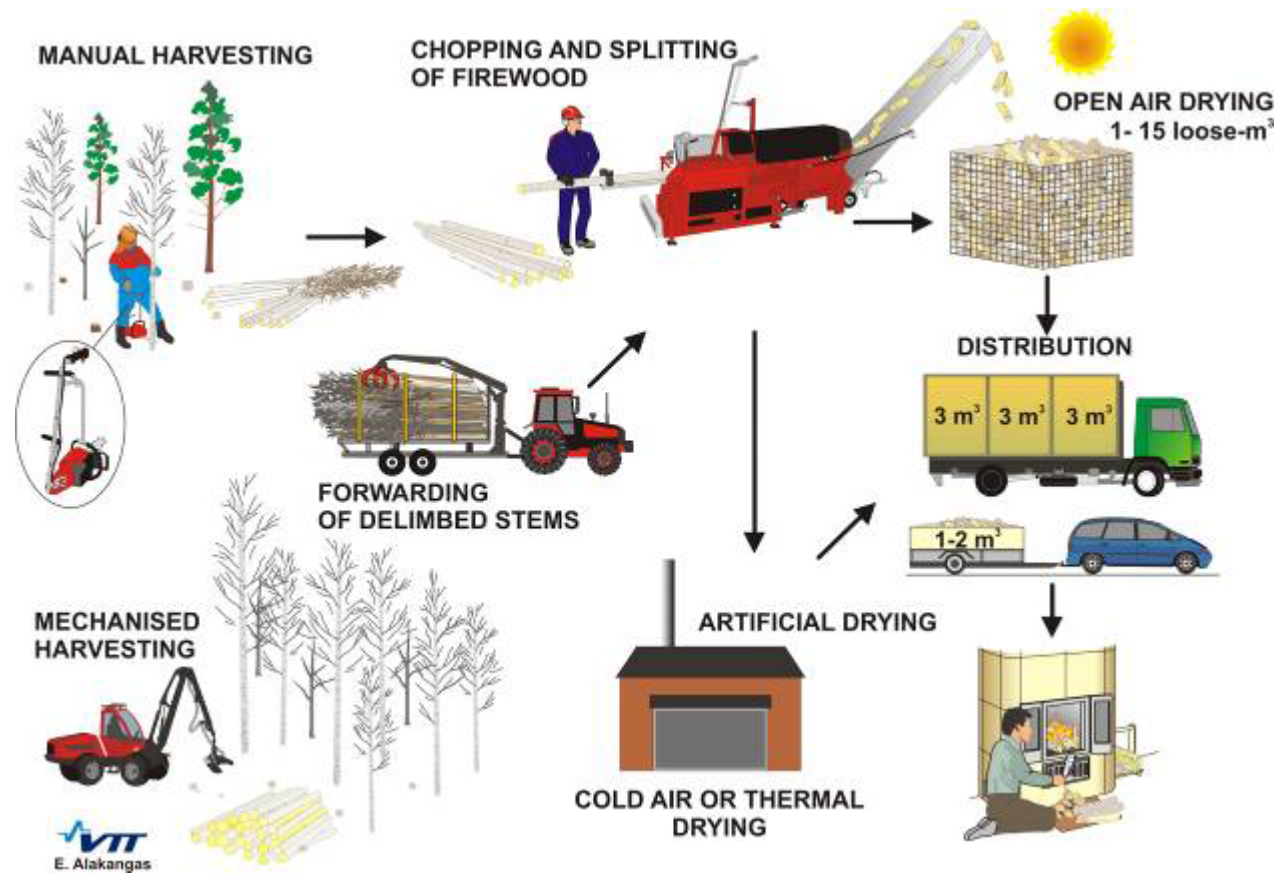


Under-fire boiler



Down-draught boiler (Kaukora Oy)

Firewood production chains in Finland



Raw material procurement

- Most round wood comes from own forest, 41% (changing-> bought from other forest owner and forestry societies)
- Birch (*Betula*) 67% is the most common raw material

Two methods:

- Manual harvesting (with chainsaw)
 - Do it yourself
- Mechanized harvesting
 - Farmer based supply chain
 - Professional supply chain

Mechanized harvesting

- Farmer based harvesting



With farm machines equipped for harvesting

- Farmer based forwarding



Mechanized harvesting

- Professional harvesting
- Professional forwarding



Professional forestry machines, firewood harvested with other round wood

Manufacturing

- Sawing-splitting separately (old fashioned) – small scale
 - Circular saw, chainsaw
 - Splitting cone, hammer splitter
- Firewood processors
 - Chopping and splitting into desired dimensions
 - Processing of delimbed stems
 - Semi-automated



Manufacturing

- Shearing machines (splitting and cutting with a rotating blade)
 - Fast (splitting and cutting take place basically at the same time)
 - Effective
 - Cheap
 - Good for making firewood for boilers and furnaces
- Quality not always good enough
 - Length not exact
 - Splitting only in two
 - Cutting surface not smooth



Manufacturing

- Sawing-splitting processors (sawing first, hydraulic splitting after)
 - Good quality
 - Adjustable
 - Good for firewood traders



- Less productive
- More expensive

Drying

- Natural (seasoning outdoors)
 - Traditional, the most common
 - Cheap; no investments, no extra energy
 - Success depends on weather, max. 90 days/year
- Artificial with cold or warm air
 - Air blown or sucked through firewood pile
 - Quality control easy
 - Enables regular production



Packing, delivery

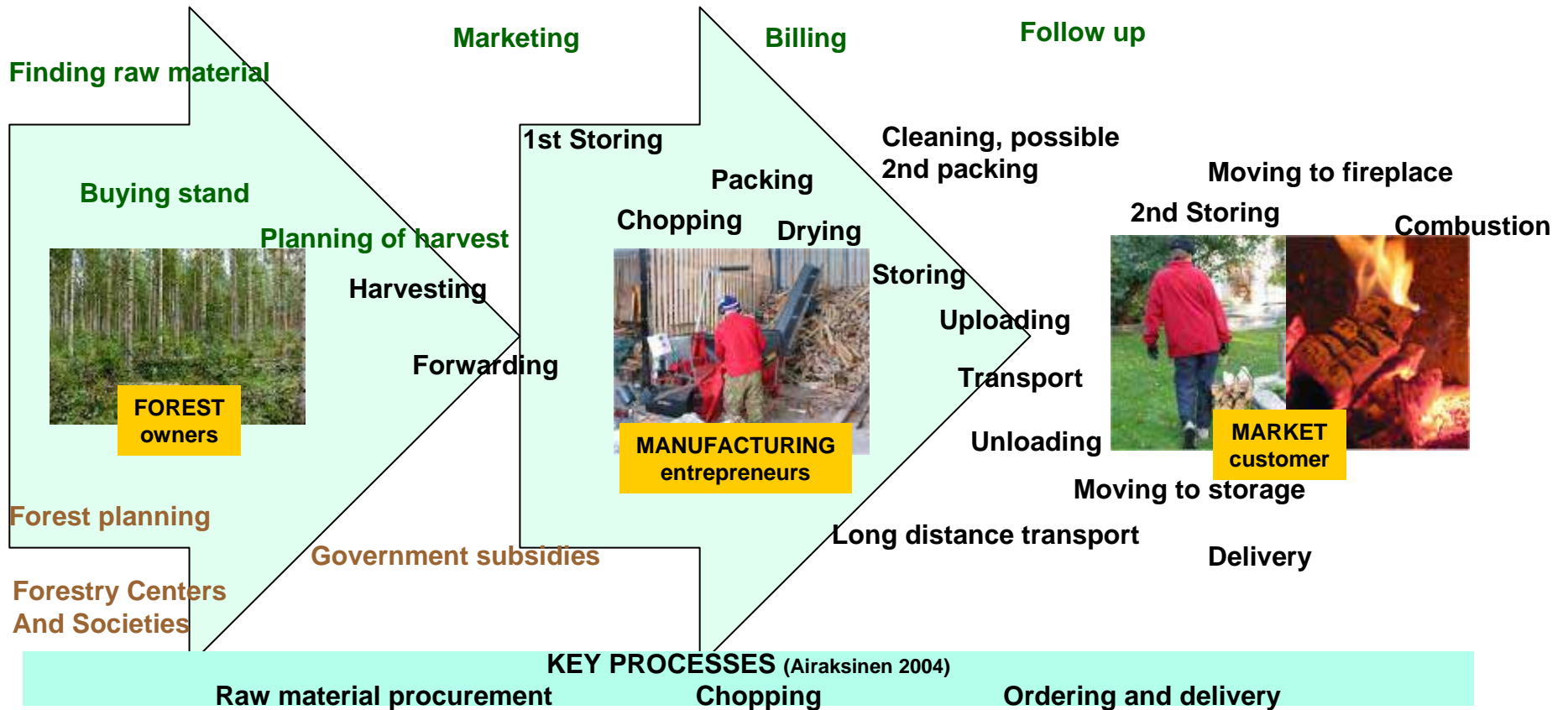
- Most firewood sold unpacked, packed 15% (growing)
- Delivery with farm tractor, other vehicle+trailer, truck, or van



Packages usually 20-40 l or 1-2 m³



Production oriented business



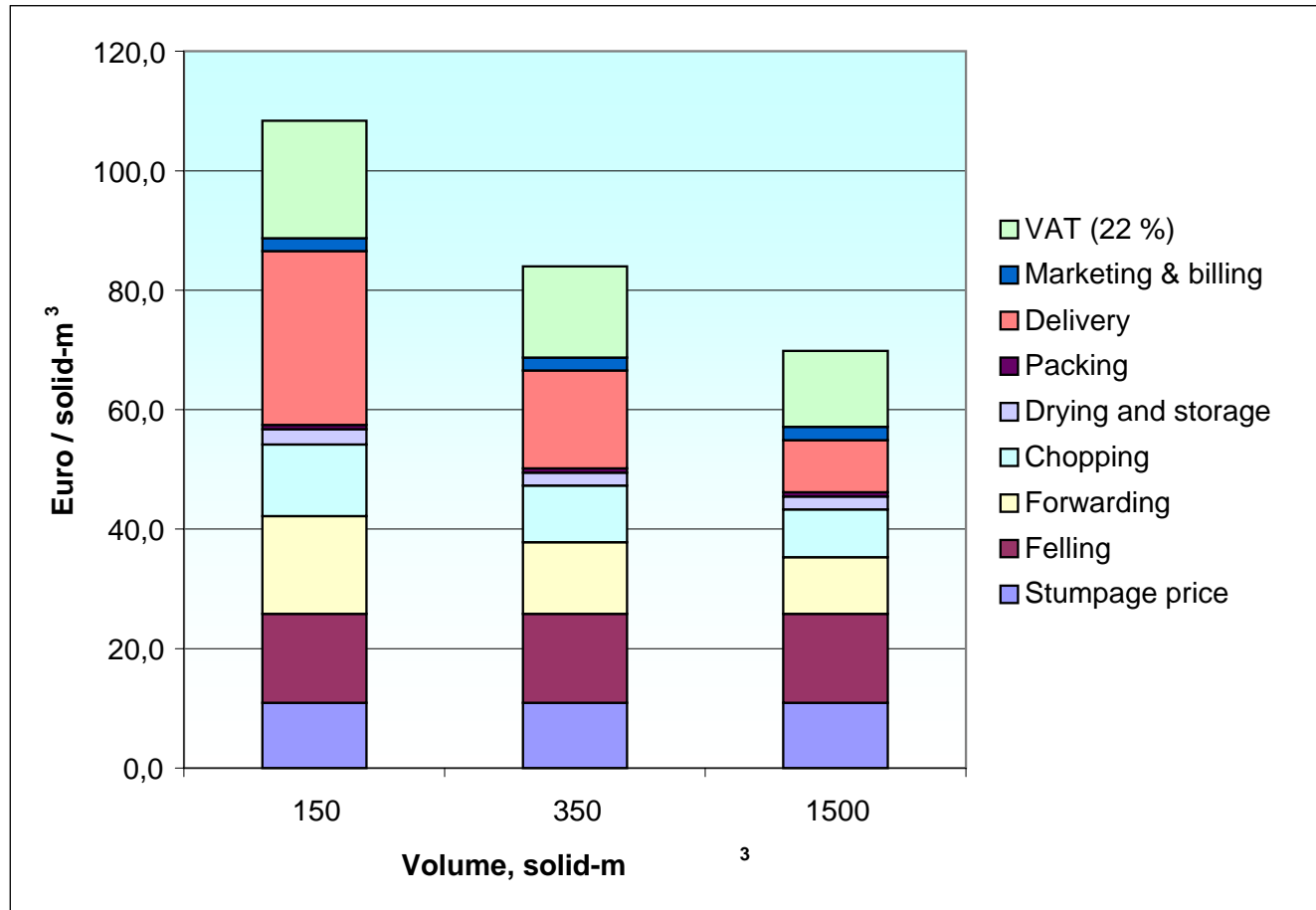
Traditional firewood production

- Raw material and production oriented
 - Producers are non-professionals (often farmers)
 - Production costs not necessarily calculated
 - Time consuming
 - One man business
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- + Gives additional work and income
 - + Better price for timber
 - + Expensive machines in productive work

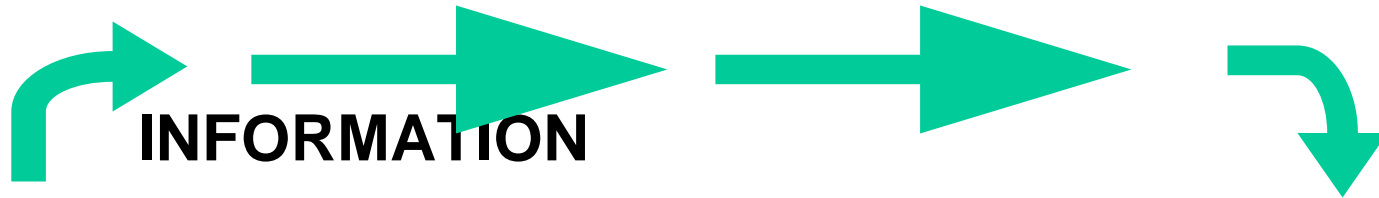
Costs

Production volume per year, solid-m³	150	350	1500
Stumpage price	11	11	11
Felling	15	15	15
Forwarding	16,1	11,7	9,2
Harvesting, €/ solid-m³	42,1	37,7	35,2
Chopping & splitting	12,2	9,6	8
Drying & storing	2,2	2,2	2,2
Packing	0,7	0,7	0,7
Marketing & billing	2,2	2,2	2,2
Delivery	29,3	16,3	8,9
Production and delivery, €/ solid-m³	46,6	31	22
Total, €/ solid-m³ (VAT. 0 %)	88,8	68,7	57,2
VAT. (22 %)	19,5	15,1	12,6
Total, €/ solid-m³ (VAT. 22 %)	108,3	83,8	69,8

Costs



Service oriented firewood business



INFORMATION

CHOPPED FIREWOOD

WHAT CUSTOMER REALLY WANTS

WHAT KIND OF DELIVERY GOOD FOR CUSTOMER

HOW TO MANUFACTURE THE WANTED PRODUCTS

WHERE TO FIND GOOD RAW MATERIAL FOR REASONABLE PRICE



Marketing
Follow up

Billing

Storing
Unloading

Transport

Long distance transport

Chopping
Drying
1st storage



Planning of harvest

Transport Harvesting



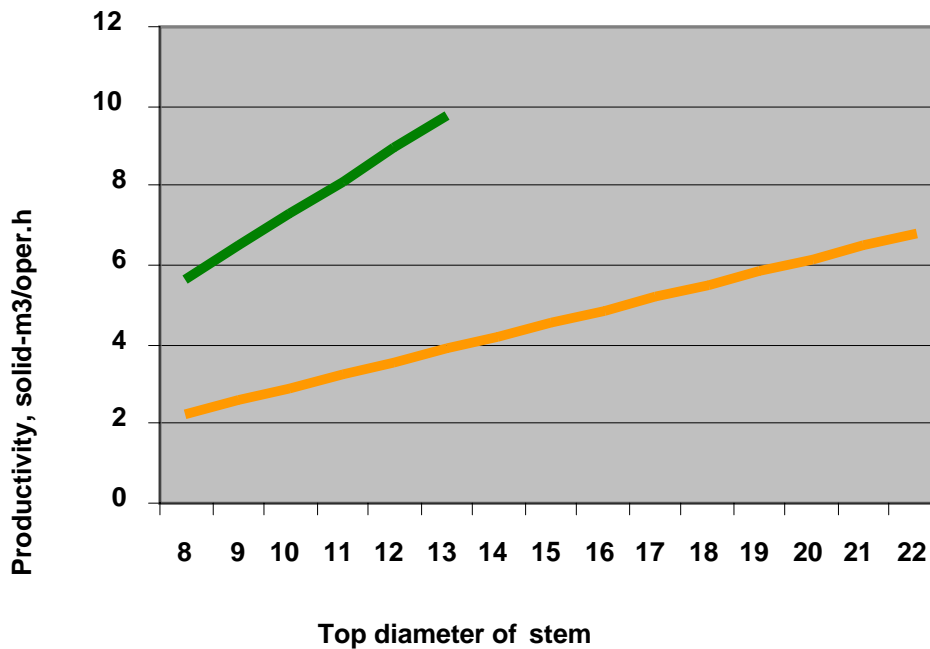
Buying of raw material

Forestry planning
Advisory aid for private owners

Subsidies for energy wood

Two manufacturing lines

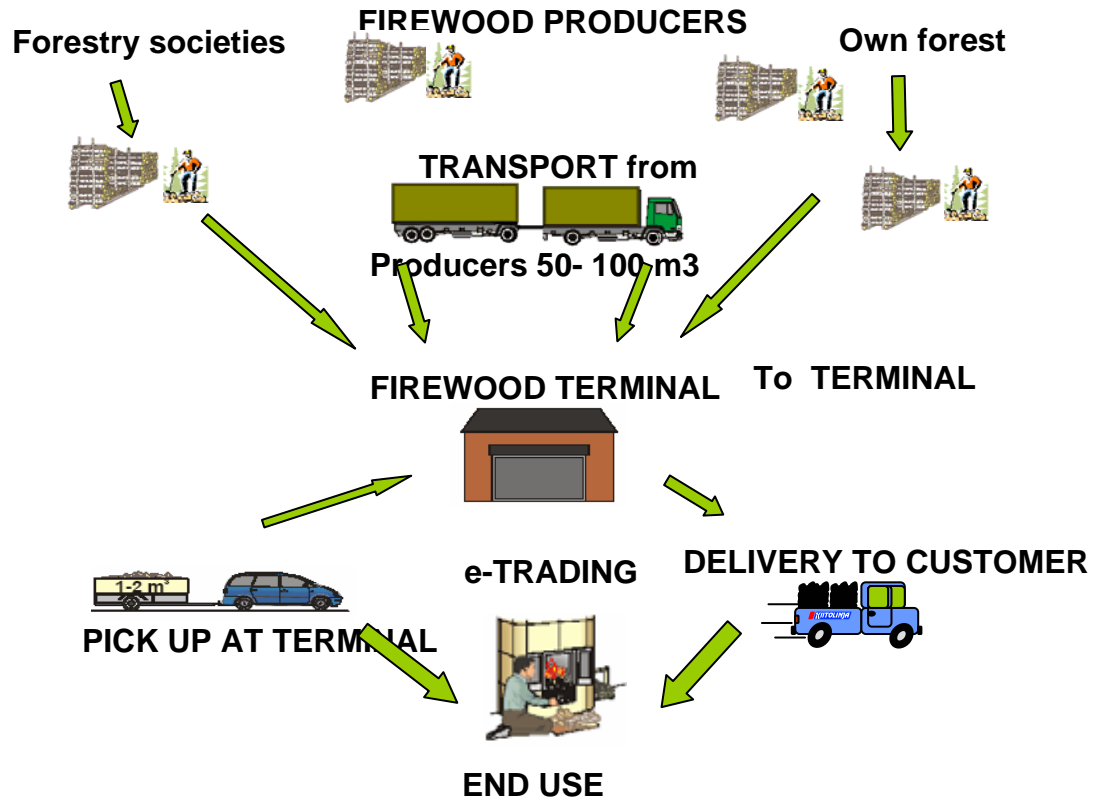
- < 13 cm diameter stems processed with shearing machine, bigger ones with sawing-splitting processor



— Sawing machine
— Shearing machine

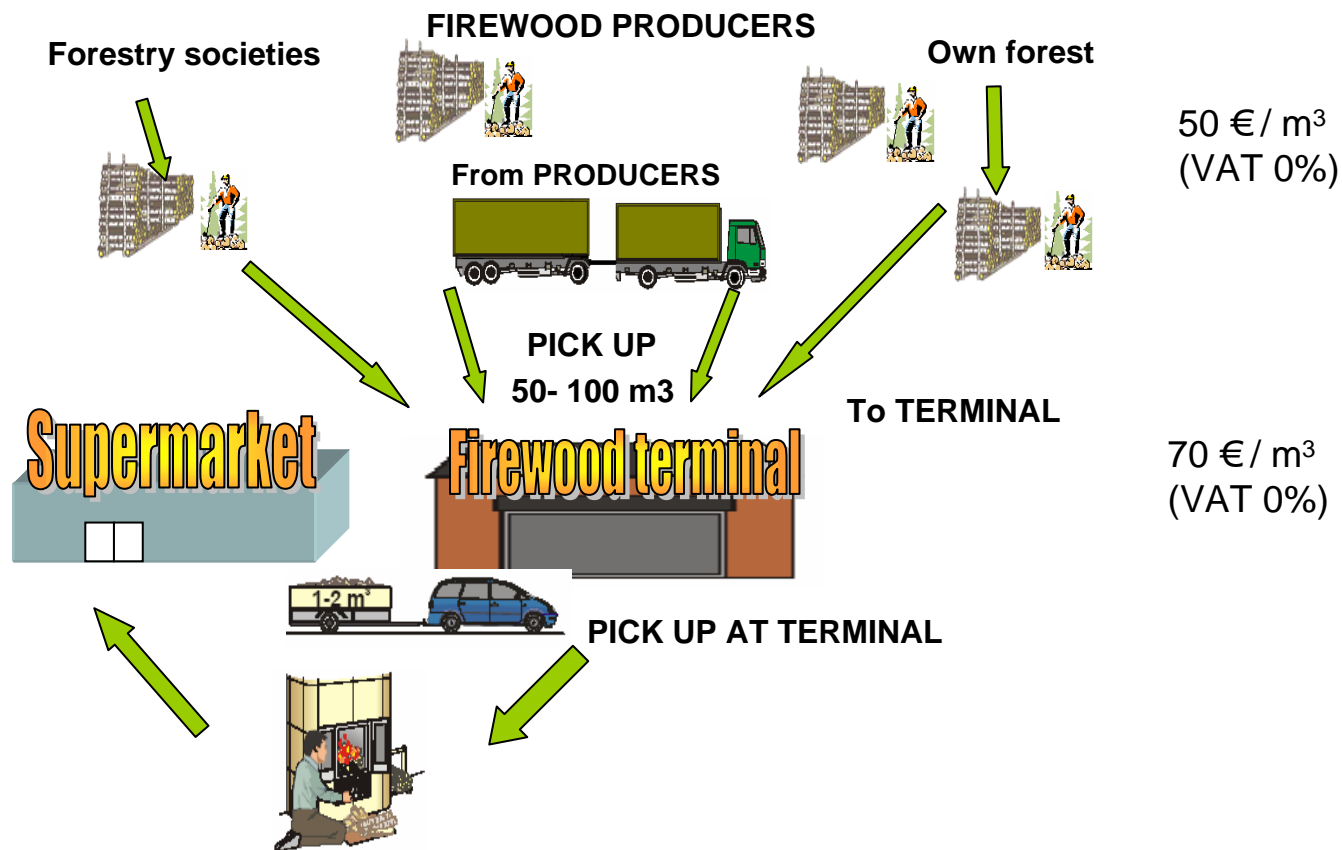


'Virtual' firewood factory



E-Trading

Firewood terminal



Modern firewood business

- More professional (bigger volumes)
- More automated (packing will develop)
- Specialized (products, work phases)
- Customer oriented
- Growing business



Firewood harvester

Source: www.eufirewood.info

Thank you for your attention !