Timberjack
A John Deere Company

"Sustainable Development Issues and Corporations - Case Timberjack"

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- Bioenergy in Finland
- Timberjack's Bioenergy History
- Bundling of Forest Residuals
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Timberjack as a Company

A World Leading Forest Machine Company

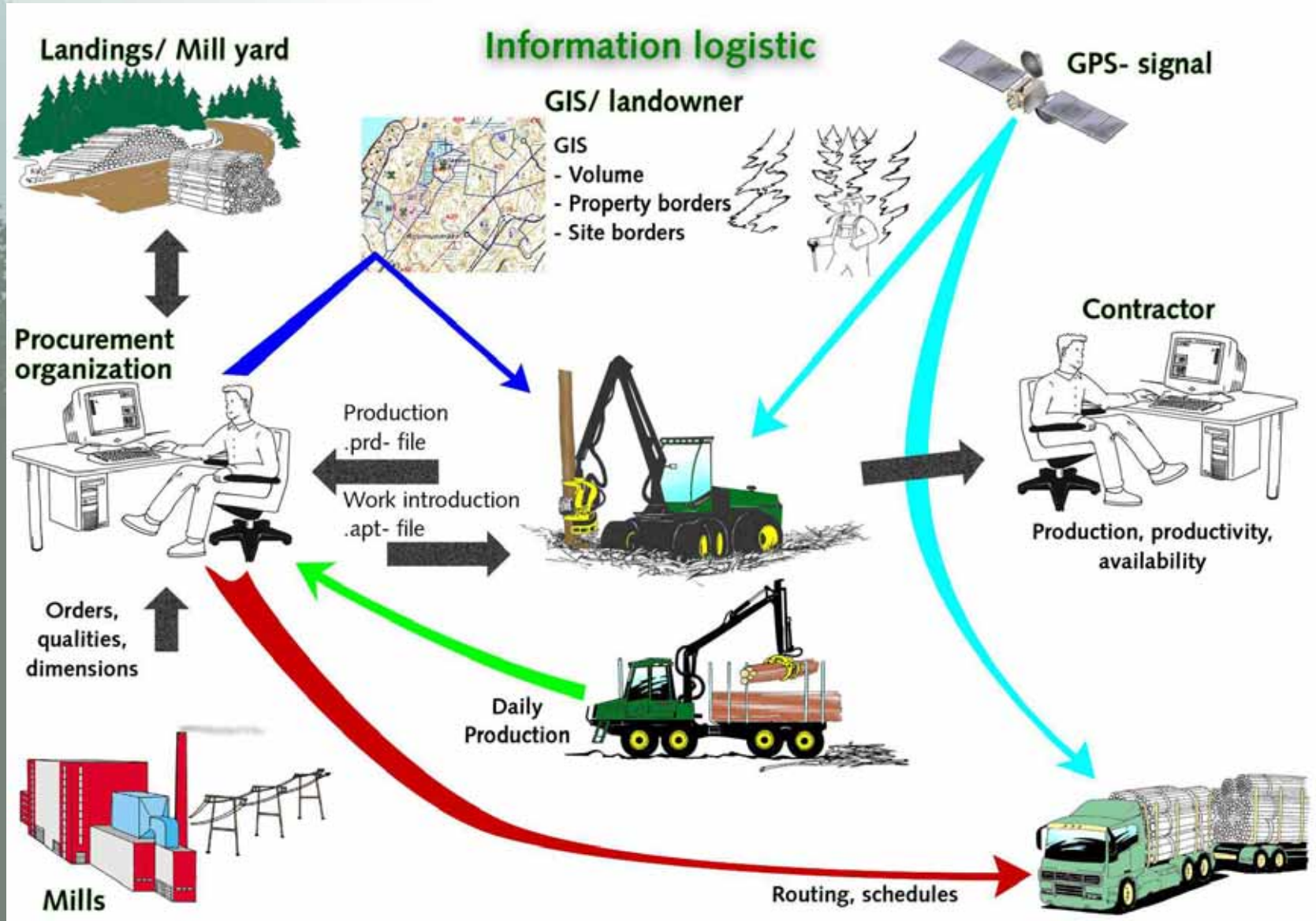
- **Market share > 40%**
- **Belongs to John Deere Corporation**
- **Net sales > $5.877 milj. (JD Corp.)**
- **Employees: 2000 (Timberjack)**
- **Production, Finland (CTL), Canada & USA (FT)**
- **Own company in 13 countries**

HARVESTERS

FORWARDERS

BIOENERGY TECHNOLOGY

Information flow of the Wood Production



Company´s View on Environment and Sustainability

- **Forests are our natural and renewable resource and that should be respected**
- **Timberjack develops environmental friendly forest machine technology for wood products and renewable energy**

Company´s View on Environment and Sustainability

- **In theory, all the energy consumption should be renewable. Also all manufacturing and R&D should be sustainable**

- **However, the recent development in Europe is increasing the use of the fossil fuels and the dependency of the imported energy. The development should be totally opposite**

Company´s View on Environment and Sustainability

- **We should certainly create new tools to improve the competitive advantage of Europe. With energy and environment this is especially important**
- **There should be more investments into RES and tax advantages to the companies who use RES or behave sustainable way**

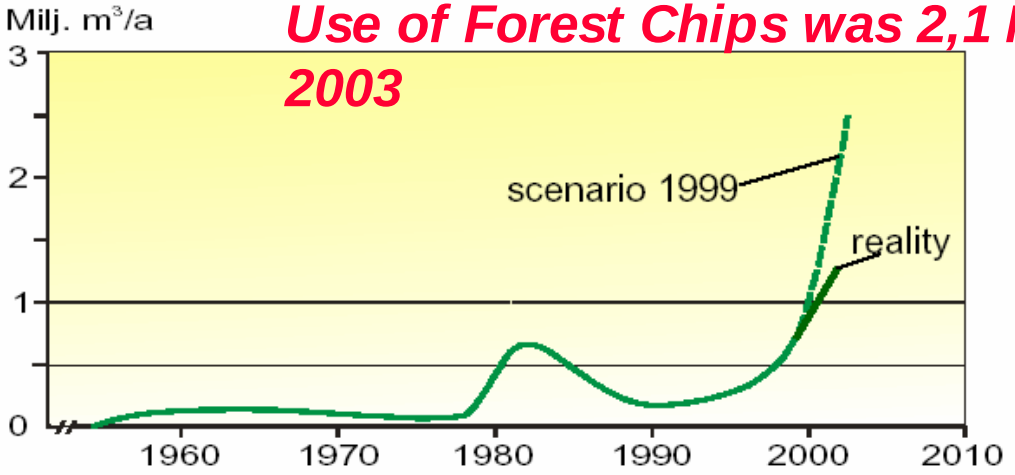
Company´s View on Environment and Sustainability

- **Sustainable technology should be seen as an opportunity not as a threat**
- **The organizations and enterprises developing the sustainable technology should be rewarded. The current tools are not enough**
- **The EU Commission is setting the targets but not providing very much practical tools**

Use of wood fuels in Finland

- Wood fuel 20 % of primary energy production (6.1 Mtoe)
- Industrial wood residues 1.6 Mtoe
  - own use 1.3 Mtoe
  - DH and CPH sector 0.3 Mtoe
- Black liquor 3.4 Mtoe
- Domestic firewood 1.1 Mtoe
- **Use of forest residues in 2001 was 1.3 million m³ equivalent to 0.17 Mtoe**

Use of Forest Chips was 2,1 Milj. M³ in 2003

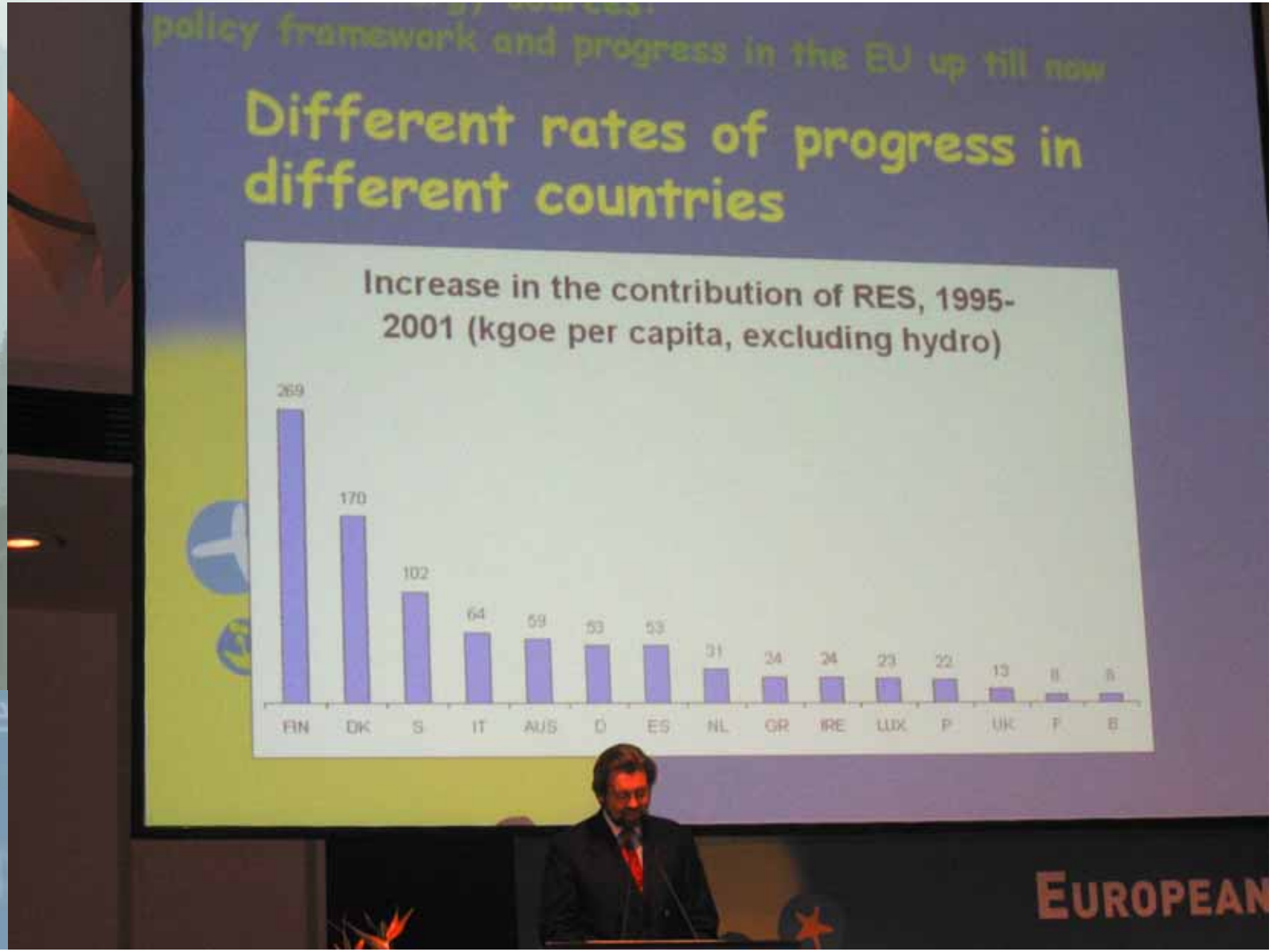


METLA

Company´s View on Environment and Sustainability

- **Finland has increased the use of the RES the most in the EU**
- **This is due to the right policy of the government**
- **There is nowadays very positive atmosphere to develop renewable energy and sustainable methods**

Berlin, Jan. 19. 2004, RES Conference



History of Timberjack Energy Technology

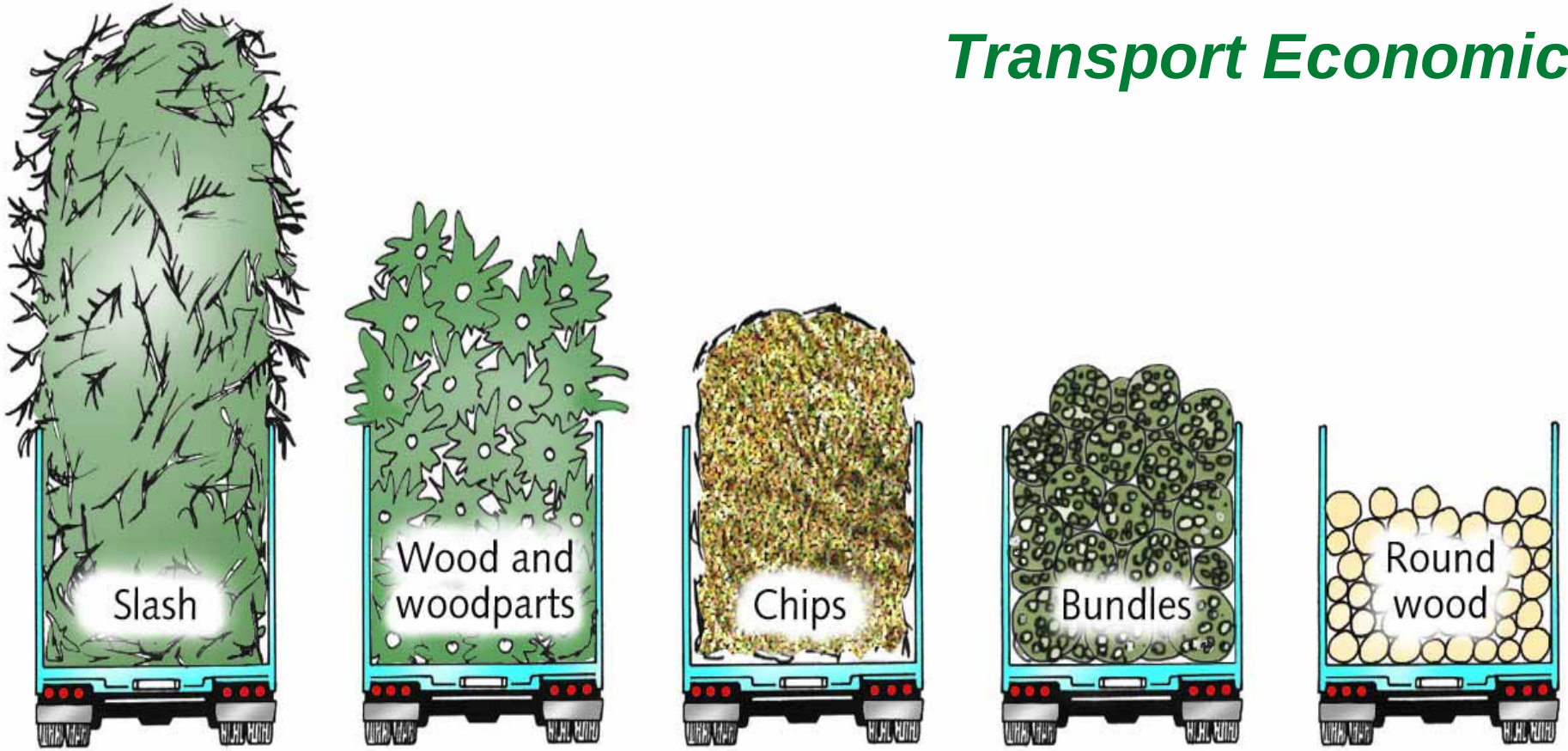
1997-1998 Feasibility study on Bioenergy Business fo Timberjack

KMW Energi Ab, 25% shares, 1999 (ERJO, Markaryd and KMW Energi, Norrtälje, Sweden)

History

first guess / try

Basic Problem of Biomass Utilization: Transport Economics



History of Timberjack Energy Technology

Co-Operation agreement with Fiberpac Kb, Vislanda, Sweden 1999

Fiberpac 370 product rights 2002

Slash Bundles

New Technology

As a Result a New Innovation for Renewable Energy was created – Timberjack 1490D

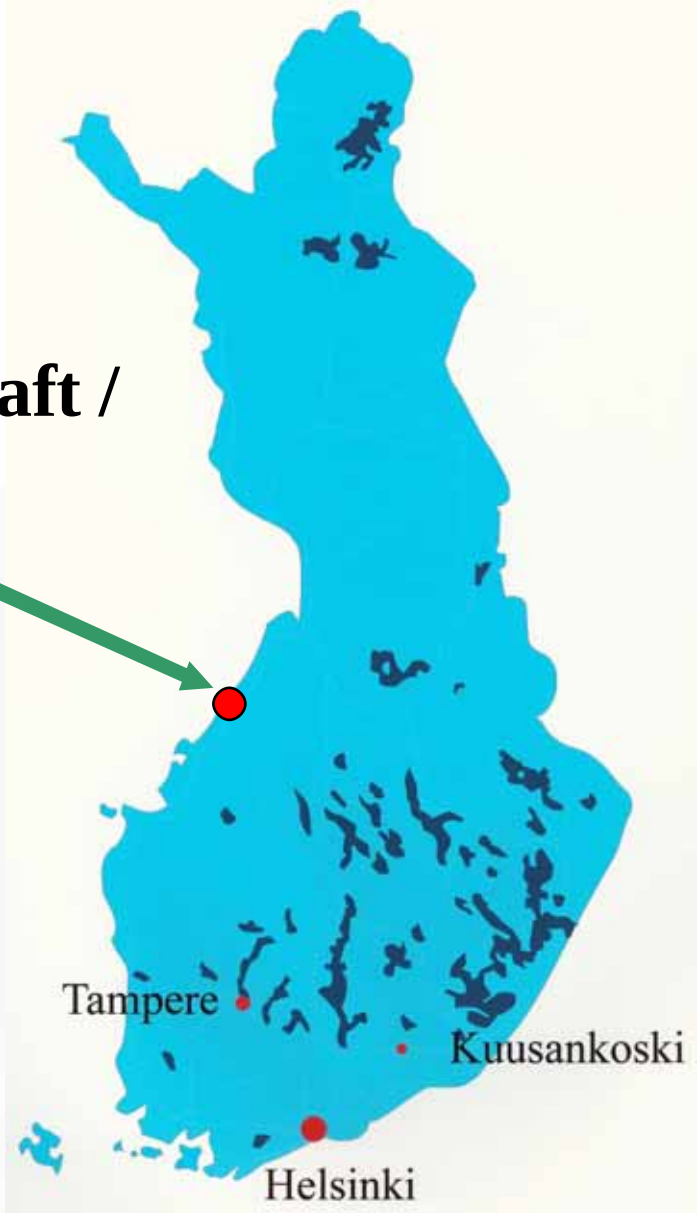
Taking Care of the Young Forests

Energy harvesters for taking care of young forests

Stumps…….

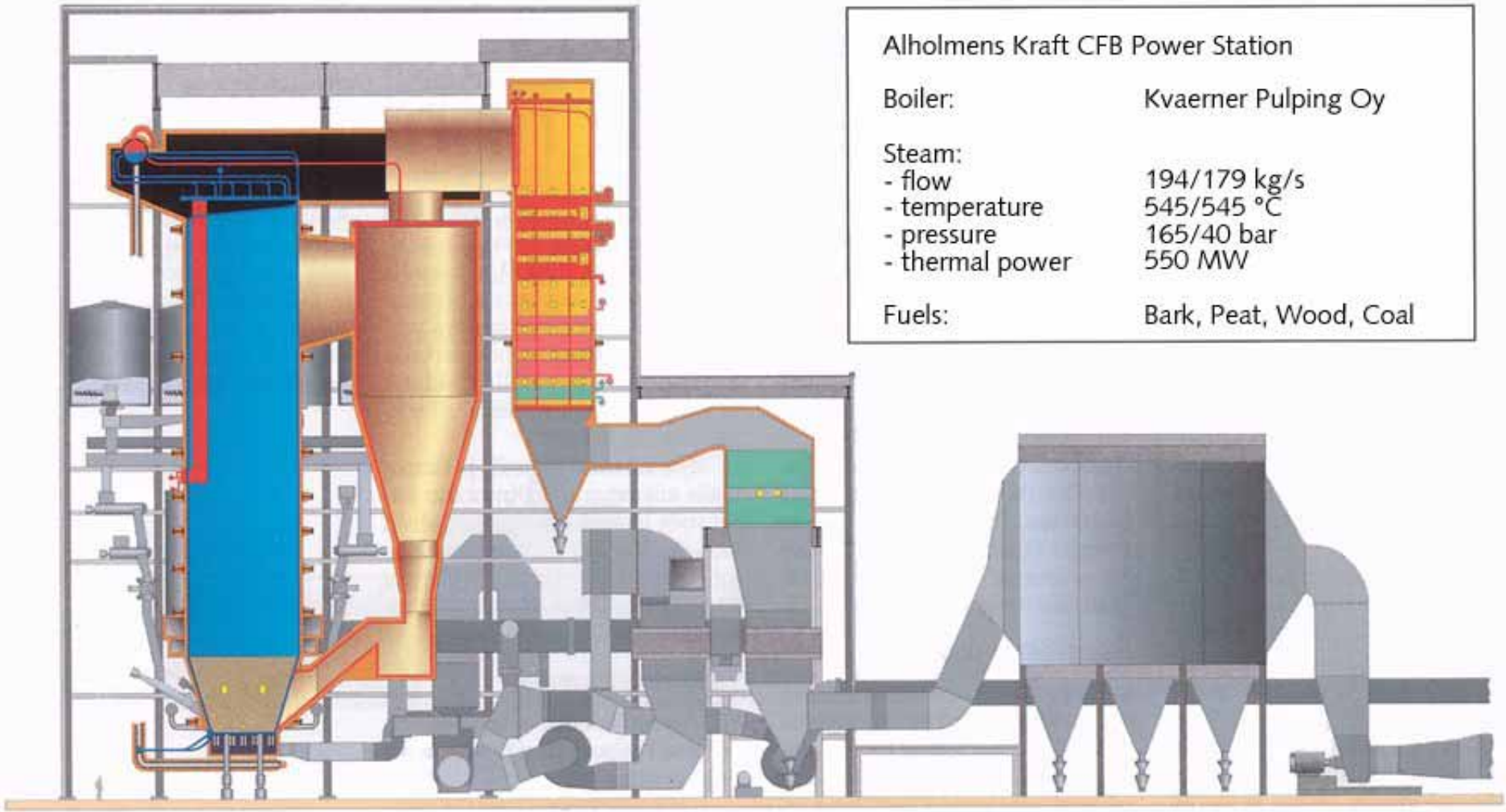
Pilot Project in Finland

Alholmens Kraft / Pietarsaari



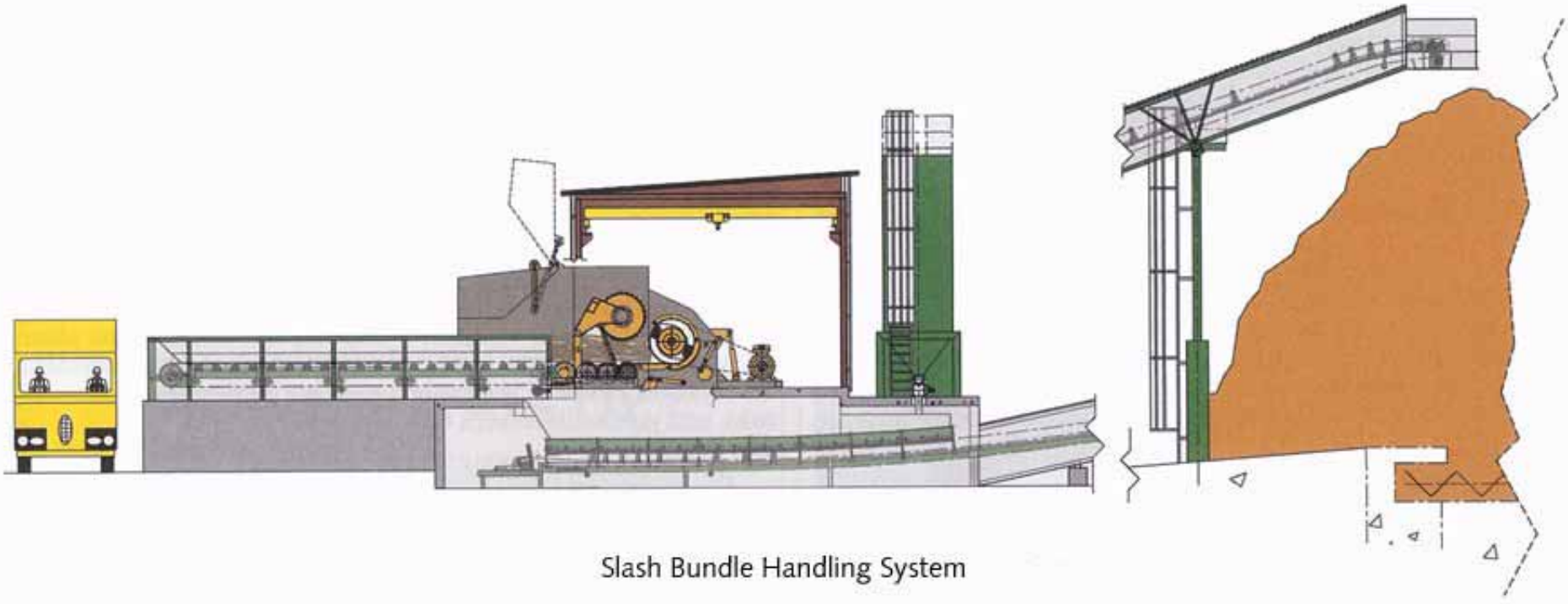
Alholmens Kraft, Winter 2001, P= 550MWth

Alholmens Kraft, CFB Boiler Station



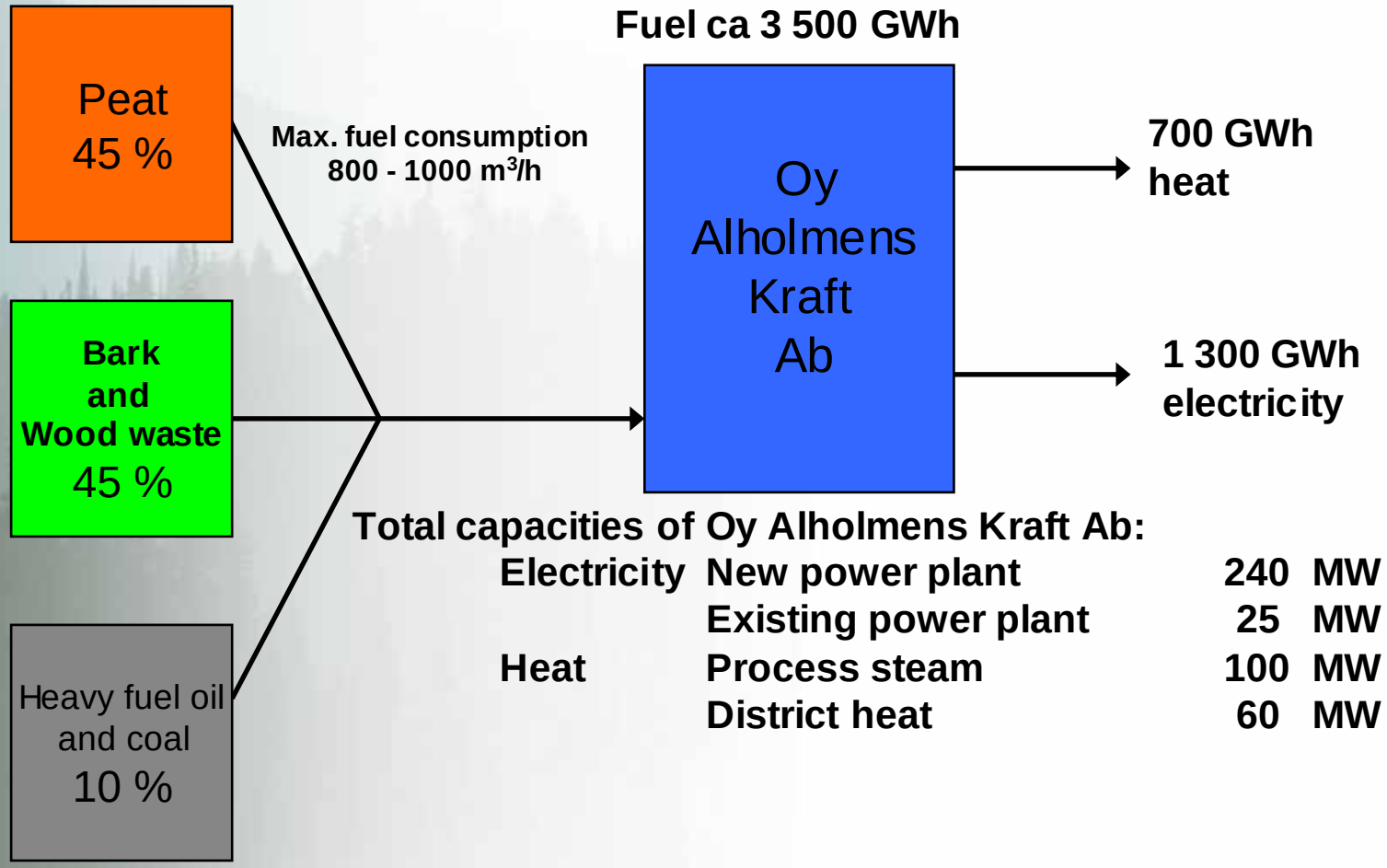
Alholmens Kraft CFB Power Station	
Boiler:	Kvaerner Pulping Oy
Steam:	
- flow	194/179 kg/s
- temperature	545/545 °C
- pressure	165/40 bar
- thermal power	550 MW
Fuels:	Bark, Peat, Wood, Coal

Bundle Grinding



Slash Bundle Handling System

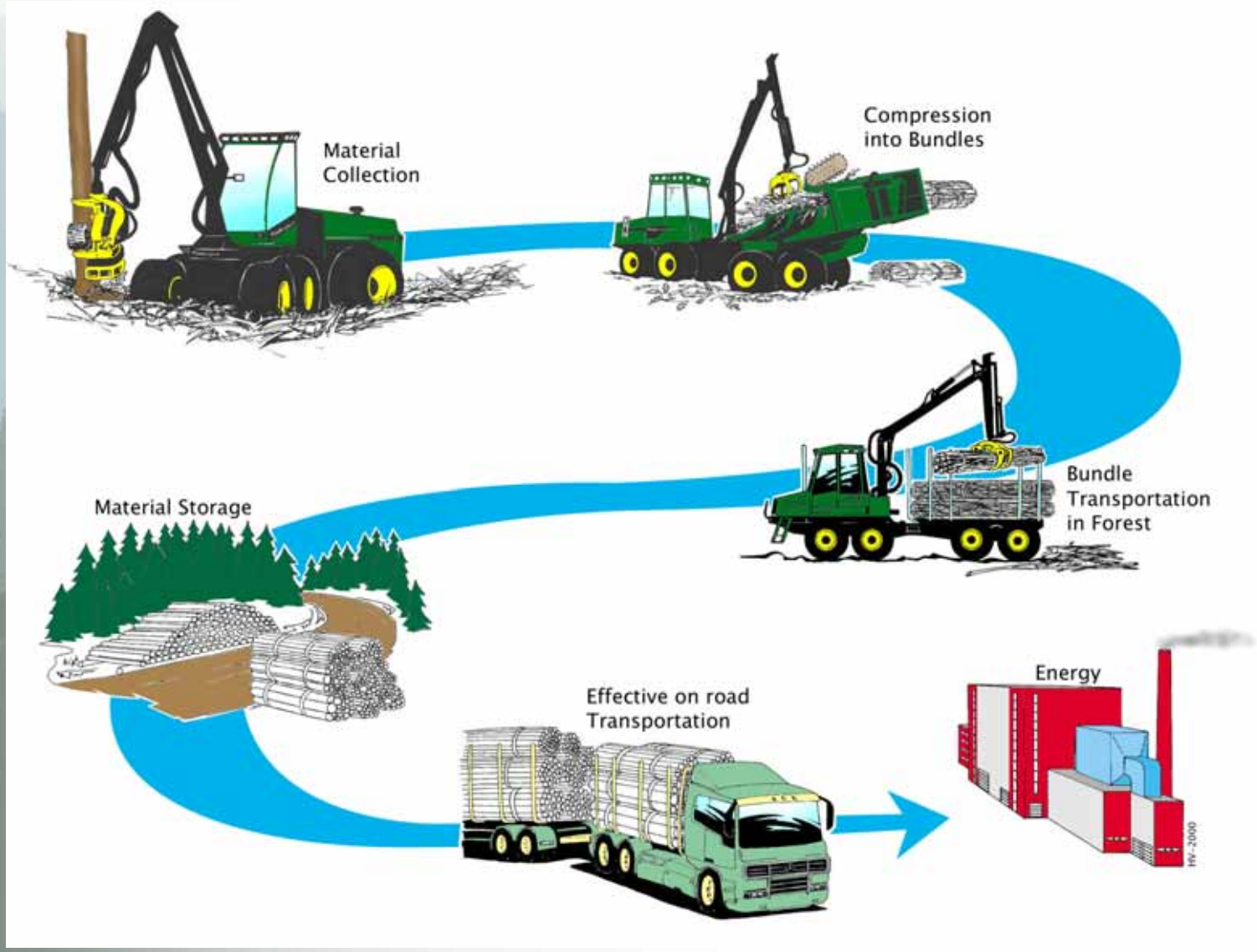
Annual Production and Consumptions of Pietarsaari Power Plant



Total capacities of Oy Alholmens Kraft Ab:

Electricity	**New power plant**	**240**	**MW**
	Existing power plant	**25**	**MW**
Heat	**Process steam**	**100**	**MW**
	District heat	**60**	**MW**

Complete Chain



New Technology – Bundling

Bundles Transporting

AK, Pietarsaari, Finland

World's First Slash Bundle Train

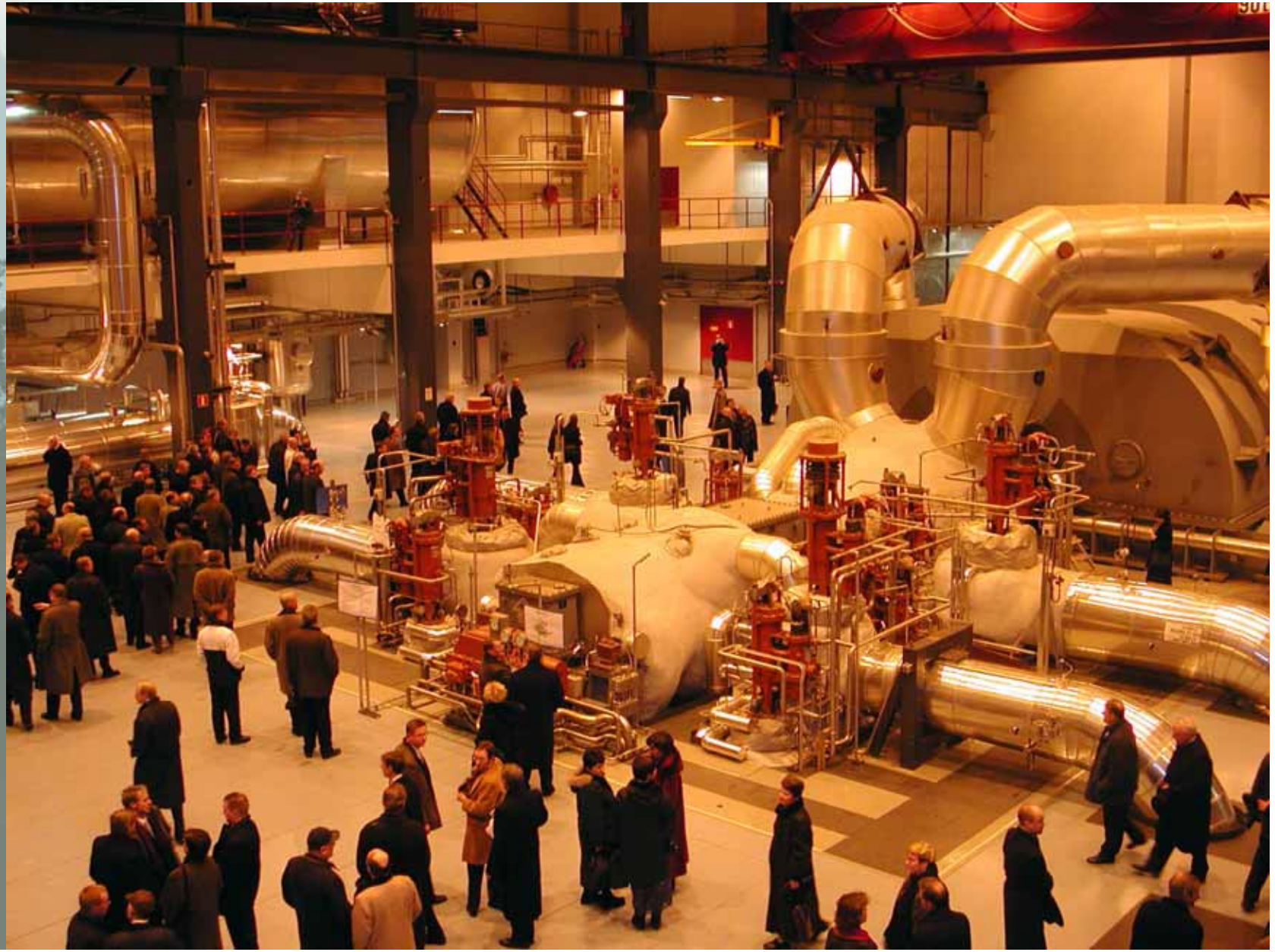
AK Fuel Handling

AK Fuel Handling

Alholmens Kraft, opening December 10. 2001 “firing bundles”

Alholmens Kraft, opening December 10. 2001 “firing bundles”

Alholmens Kraft, opening December 10. 2001 “turbine hall”



PVO/UPM Projects in Finland

Place	*Boiler capacity*	*Status*
• Kokkola	--- 90 MWth	in use, Oct 01
• Pietarsaari	--- 550 MWth	in use, Jan 02
• Jämsänkoski	--- 185 MWth	in use, May 02
• Kuusankoski	--- 225 MWth	in use, Sep 02
• Ristiina	--- 80 MWth	in use, May 02
• Savonlinna	--- 81 MWth	in use, Sep 03
• Tervasaari	--- 150 MWth?	2006+ (planned)
• Rauma	--- 150 MWth?	2005 (planned)
• Kaukas and Voikkaa	--- ??	2006 +

Summary of bundles in Finland

In Year 2003, there was:

720.000 bundles made in Finland,

Target 2004 = 1.250.000 bundles i.e. 1.3 TWh

Target 2005 = 2.000.000 bundles i.e. 2.1 TWh

FORENERGY PROJECT

June 2001-May 2004 (Commission Funding 1,74 M€)

AFOCEL, Forestry technical institute / France
ARCS, Austrian research center - Environment division / Austria
CEMAGREF, National Agricultural & Forestry research center / France
IRL, National research center - Florence division / Italy
UPM-Kymmene / Finland

By May 2004, tests and demonstrations performed in:

- Austria
- Finland *
- France
- Germany
- Italy *
- Spain *
- Switzerland *
- Sweden *
- Portugal
- USA
- Hungary
- Czech Republic *

* Commercial operation

Hungary January 2004

Hungary January 2004

Hungary January 2004

Austria

France


South Italy

Spain

Sweden

Timberjack Slash Bundlers in Operation (May 2004):

Finland: 21
Spain: 3
Sweden: 2
USA: 1
Switzerland: 1
Italy: 1
Czech Republic: 1
Total: 30

Timberjack 1490D

Bioenergy utilization requires a new type of co-operation:

Power plant designers

Power companies

Funding Organizations

Political level

Forest owners

Forest industry

Machine builders

Environmental organisations

USA (California, October 2003)

USA (2003-2004)

Biomass in Arizona, October 2003

PROPOSALS:

- **The traditional methods are too strong and cheap. This should be corrected by the right tools / policy**
- **New criterion and tools needed in EU's R&D support**

PROPOSALS:

- **Serious actions to promote RES. Benefits for the forerunners**
- **More investments into development of the alternative energy sources.**
- **Tax benefits for the RES. The enterprises should get benefits not only punishments and restrictions**

PROPOSALS:

- More actions towards the development of the complete supply chains
- More actions to improve the “real” networking
- Help for the enterprises to demonstrate the new technologies

In Finland the methods to increase RES have been:

- **Public funding for the long term R&D**
- **Investment supports**
- **Tax benefits for RES**
- **The National targets are set in a good co-operation between industry and government**
- **Commitment to the targets has been very high**

CONCLUSIONS - 1:

- **Only a nation that has a strong economy can afford to develop and use environmental friendly energy resources sustainable way.**

CONCLUSIONS - 2:

- **The Bioenergy Utilization and Technology is on a rapid increase in Finland**
- **Timberjack has been able to introduce the new technologies into the other countries too**
- **Bundling lifts the forest residual utilization on a new “industrial” level**
- **Bundling is very potential method for fire prevention**

EU – Bundle

EUROPEAN COMMISSION

Community Research

THE EUROPEAN RESEARCH AREA

for a sustainable energy future

Research is becoming increasingly complex, multidisciplinary and expensive to perform. The fragmented approach that has typified European research and development for many years is no longer adequate to meet today's challenges.

Work in progress

Collection of forest residues (courtesy of Timberjack).

Examples of preparatory activities include:

- In the area of hydrogen and fuel cells, a running project (FHIRST) is studying alternative management, advisory and networking structures for ERA. A parallel initiative by the Commission proposes a *Fuel Cells and Hydrogen Technology Platform* to bring all existing activities into an overall structure. The aim is to permit the development of comprehensive R&D strategies and balanced and active participation of all stakeholders including industry, academics and national administrations.

- In some topics, existing large projects already involve a critical mass of important European researchers in activities that embody a long-term R&D strategy. The *DISPOWER (distributed generation)* project brings together around 40 key actors such as electrical utilities, power industry, consultants and research institutions in a structure that already incorporates many features of the proposed integrated project model.

- The PVNET thematic network within the field of photovoltaics (PV) technologies is developing a comprehensive road map for PV research and development based on a broad consensus within the European PV community. A "sister" network PV-EC-NET is benchmarking national and European programmes as a first step towards achieving its objective of better coordinated national PV activities.

- The Commission is developing a series of *Scientific and Technology References and Indicators* providing research benchmarks and goals for all of the areas of sustainable energy systems research.

Similar activities are under way in all areas of sustainable energy systems, including clean coal, gas turbines and combined heat and power (CHP), oil and gas, bioenergy, wind and wave energy, socio-economic research and energy in buildings.

Refuelling a hydrogen powered car (Courtesy of BMW).

GREENPEACE – Woodenergy!

GREENPEACE

BIOENERGIA

Puuenergiasta pitkälle

Puu on öljyn jälkeen Suomen toiseksi merkittävin primäärienergialähde. Vuonna 2001 puupolttoaineilla tuotettiin 20 % kaikesta energiasta. Tästä valtaosa, 80 % perustui metsäteollisuuden puutähteiden ja jäteliemien energiakäyttöön.

Puu on ympäristöystävällinen energialähde, jonka käyttö ei tuota hiilidioksidipäästöjä, sillä polttamisessa syntyvät päästöt imeytyvät kasvaviin metsiin. Puun palaessa puhtaasti polttoprosessissa ilmaan vapautuu vain pieniä määriä rikin ja typen oksideja. Myös hiukkaspäästöt ovat vähäisiä.

Metsähakkeen energiapotentiaalia on hyödynnetty vielä suhteellisen vähän, mutta sen käyttö on ollut jyrkässä kasvussa. Metsähaketta saadaan päätehakkuiden, taimikonhoidon ja nuoren metsän harvennuksen yhteydessä syntyvästä puuaineksesta, joka ei kelpaa metsäteollisuudelle. Nuoren metsän hoitokohteissa metsänomistaja hyötyy energiapuun korjaamisesta puuston nopeampana järeytymisenä sekä arvokasvuna vaikka ei vielä tällä hetkellä energiapuusta kantohintaa saakaan.

Metsähakkeen käytön teoreettinen lisäysmahdollisuus on mittava. Ekologiset rajoitteet huomioonottaen metsähakkeeseen perustuva energiantuotanto voitaisiin jopa 14-kertaistaa vuoteen 2010 mennessä. Potentiaalin hyödyntämistä rajoittavat kuitenkin korjuun ja kuljetuksen kustannukset.

Metsähakkeen tuotantokustannukset ovat alentuneet viime vuosien kehitystyön myötä hyvää vauhtia, mutta panostusta tuotekehitykseen ja metsähakkeen tuotantoketjujen kehittämiseen tarvitaan edelleen. Myös se, miten metsähakkeen käyttöön kannustetaan veroeduin ja miten sen kilpailevia polttoaineita kohdellaan, on keskeistä. Työn verotuksen alentaminen ja pienvoimaloiden lisääntyminen parantaisivat osaltaan puuhakkeen kilpailukykyä.

Towards Sustainable Futur

Finnish Consortium (World Energy Globe)

Finnish Team, RES Take off Award **Berlin Jan. 19. 2004**

World Investment Conference La Baule, France May 27.2004

THANK YOU!

We'll do it GREEN!

see also: www.timberjack.com

Green Energy.....