Slovenian Presidency of the EU 2008

Forest land sustainability and 2nd generation biofuels

Informal meeting of Environmental ministers, Ljubljana 11.-13.04.2008

Director, professor Mikko Kara

Bio diesel developments, 2nd gen.

- **Austria** : Viena University of technology
- **Finland** : NesteOil NextBTL, Stora – Enso / Foster Wheeler, UMP / Andritz, Vapo
- **Germany** : Choren / SHELL **600 MW**, Lurgi – Statoil - Petrosa
- **Portugal** : SGCEnergy
- **Sweden** : Scania

- → Fischer Tropsch based process is closest to commersialization

10 % TARGET AND TECHNOLOGY

FIRST GENERATION BIOFUEL TECHNOLOGY IS

→ LIMITED BY SIZE AND RAW MATERIAL

→ HAS AVERAGE SUSTAINABILITY

→ END PRODUCTS HAVE LIMITED USABILITY

SECOND GENERATION BIOFUEL TECHNOLOGY

→ FISCHER TROPSCH ONLY COMMERCIAL

→ NEEDS HUGE AMOUNTS OF FUEL AT ONE PLACE

→ PREFERS HOMOGENEOUS FUELS (WOOD,PEAT,…)

→ HAS GOOD SUSTAINABILITY AND PRODUCTS

10 % TARGET AND ECONOMY

FISCHER TROPSCH PLANT IS ECONOMIC :

- **WHEN IT RUNS MORE THAN 8000 HOURS ANNUALLY FOR MORE THAN 25 YEARS**

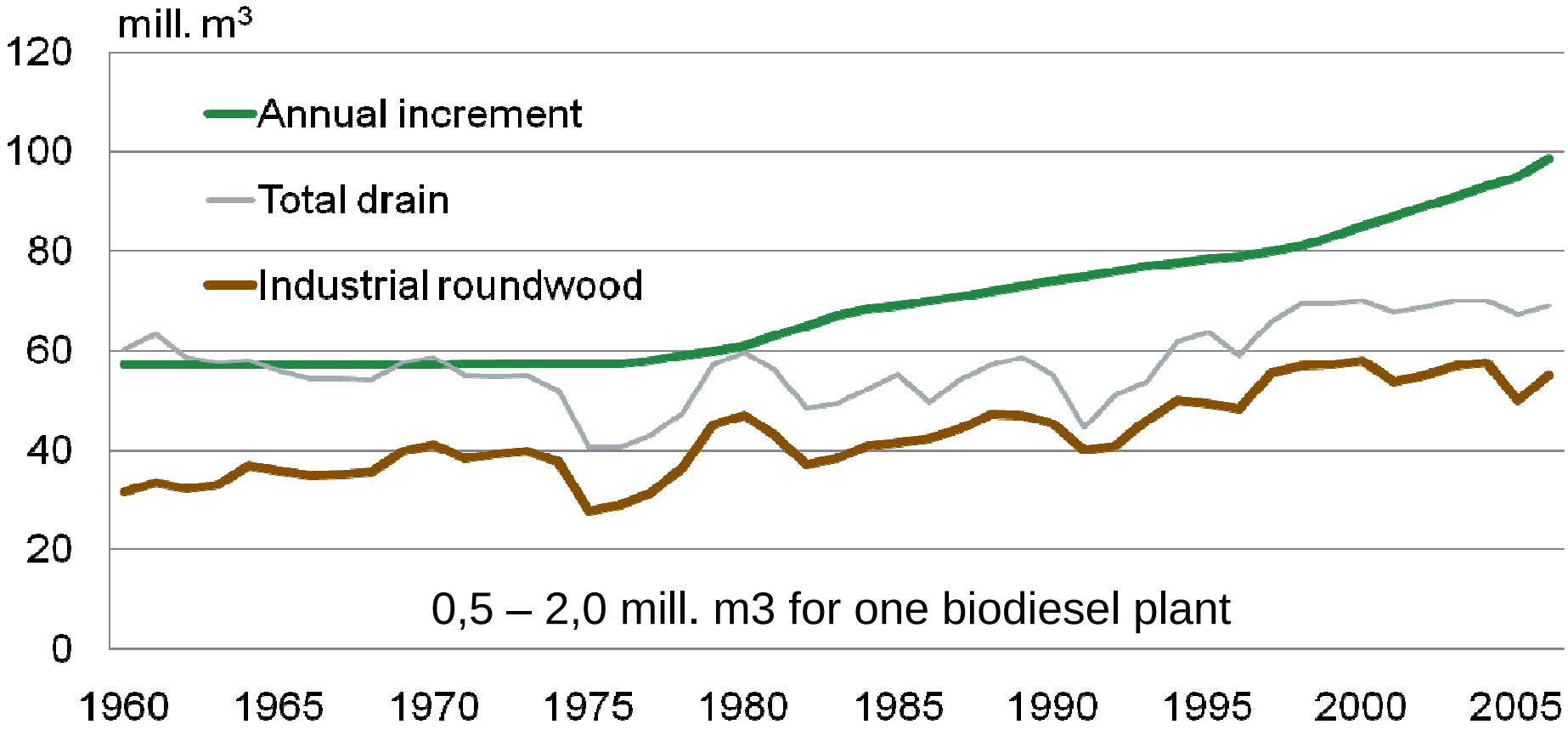
→SIZE IS ABOVE 100 MILLION LITRES BIO DIESEL PER YEAR I.E. 1,5 MILLION CUBIC METRES WOOD

→AVAILABILITY OF SUSTAINABLE RAW MATERIAL SUPPLY IS THE MOST CRUSIAL ISSUE FOR THE BUSINESS

→Price of sustainable biomass is much cheaper outside EU!

The growth of Finnish forests is 100 mill. m³ per year

Forest balance in Finland 1960-2006



Pulp, paper and wood industries use the wood efficiently for different purposes

Forests

- Forest management
- Wood procurement
- Transportation
- Sorting and drying of timber

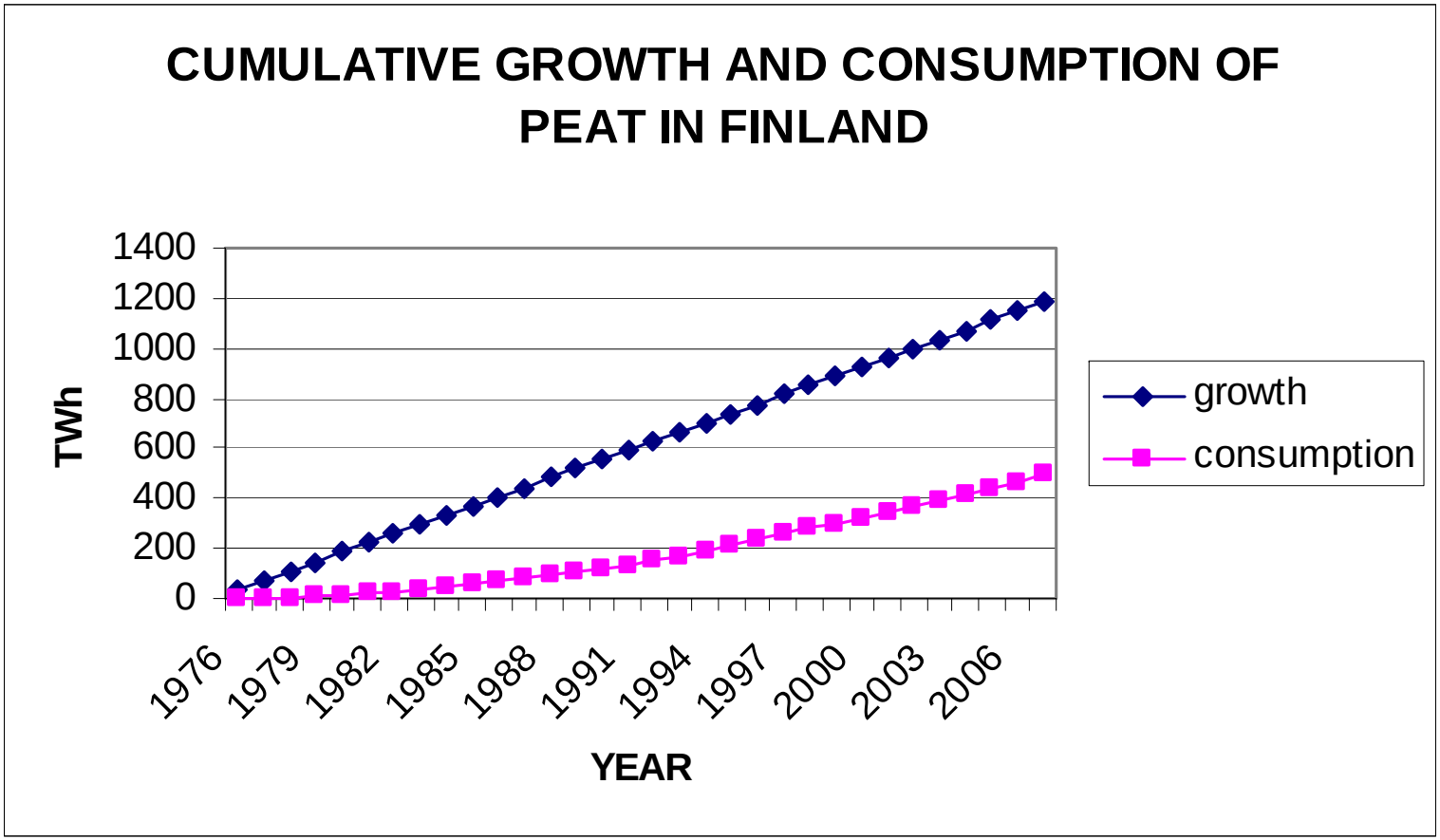
Pulp wood → Pulp, Paper, Board

Logs → Wood products

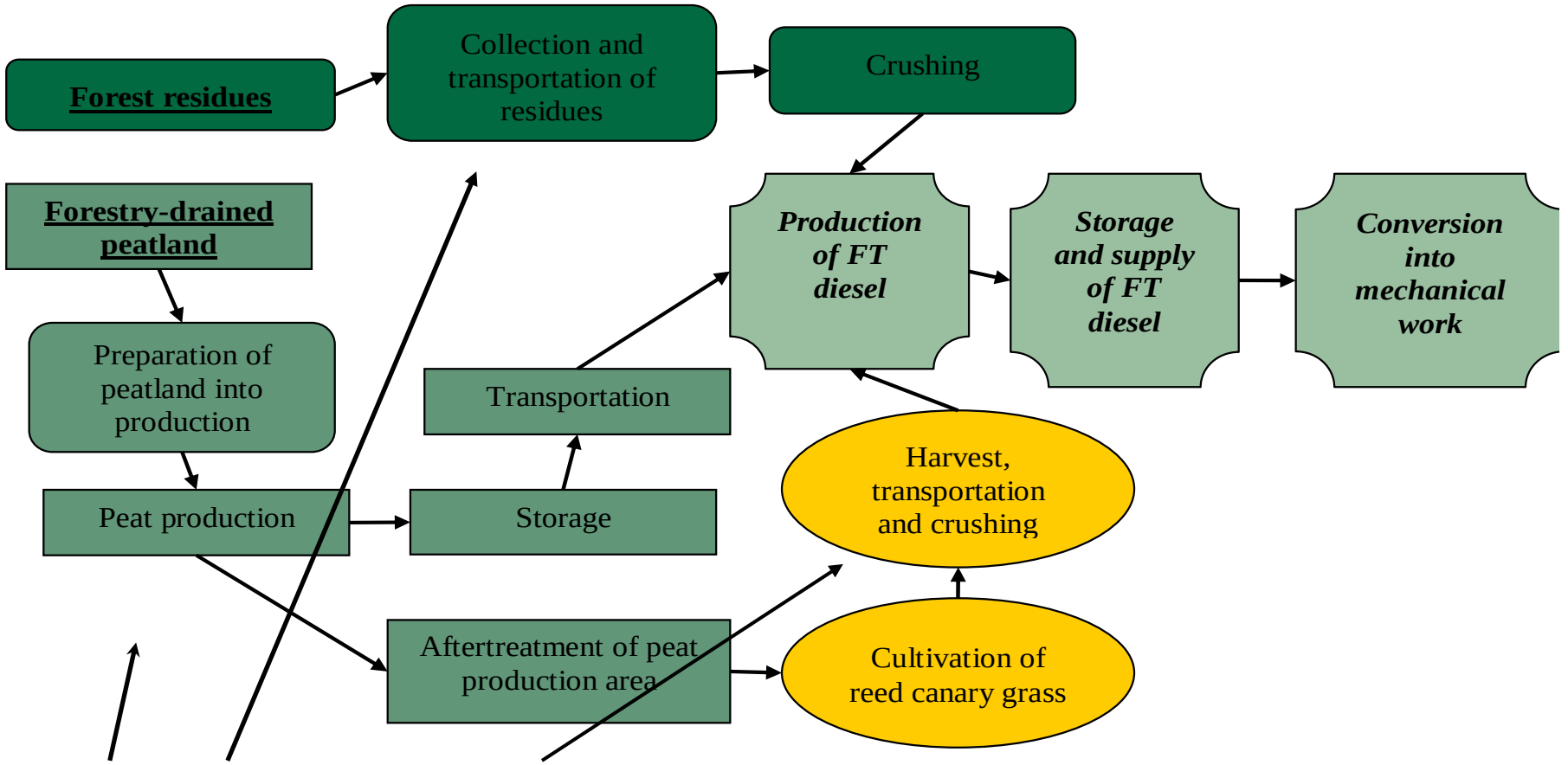
Forest residues: branches, stumps… Bio-slurries By-products → Biodiesel, Heat, Electricity

Recycling

Growth and consumption of peat in Finland



Life cycle of 2nd gener. (FT) biodiesel plant



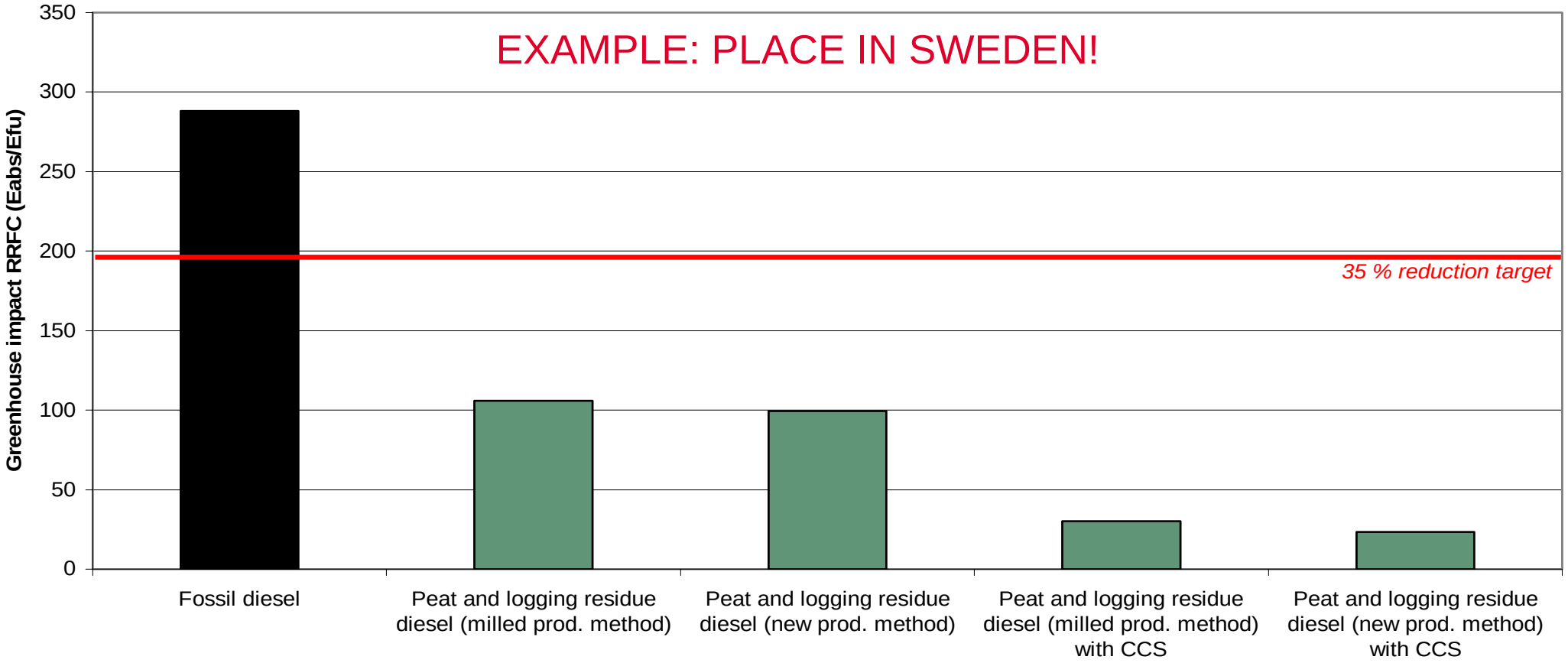
Sertified production chains!

Greenhouse impact of FT diesel production unit

(50 % logging residues, 50 % utilisation of Swedish forestry-drained peatland)

300 year time span

(zero emission electricity used in production)



Potential locations for VAPO's bio diesel factory

Security of raw-material supply for 30 years!

-Where is enough energy wood?

-Where is enough sustainable peat?

-Competition with p&p needs and direct energy use

Site specific fulfilment of sustainability criterias!

Conclusions

- **Forest growth in EU gives a technical potential for bio diesel, BUT biodiversity and price limit the sustainable use**

- **Economy of scale of 2nd generation plant (Fischer Tropsch)**

→ **limits the number potential sites**

→ **favours combined use of wood and peat in Finland and Sweden**

→ **favours integration to energy consuming industry**

- **Example :** Life cycle analysis of biodiesel using 50 % peat from forestry drained peat lands and 50 % energy wood as non fossil biomasses gives more than 35 % reduction of CO2 compared to mineral oil based diesel