Conversion Processes (I)
Bio diesel pathways & biorefineries

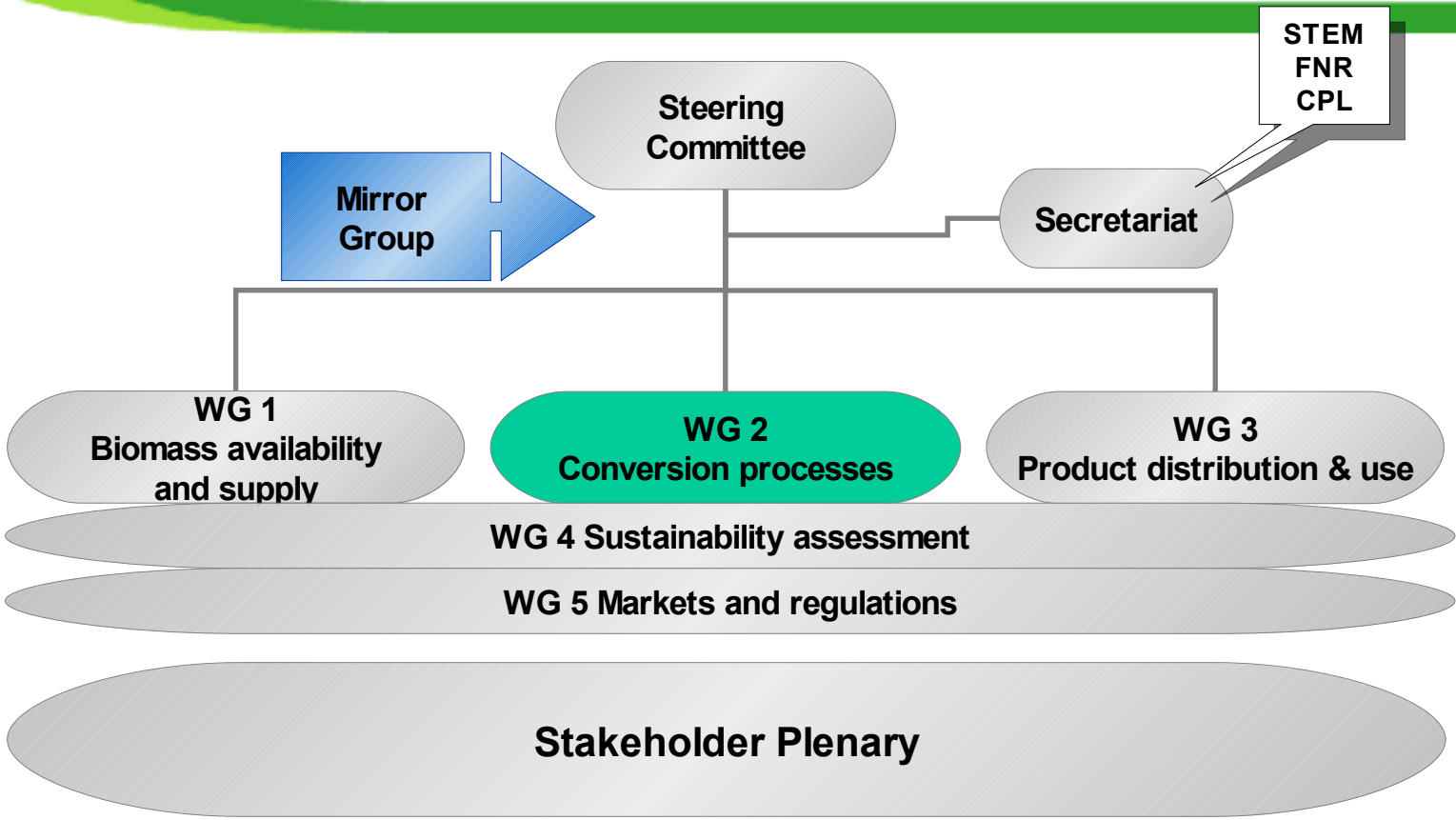
Stakeholder Plenary Meeting
Brussels
January 31, 2008

Harri Turpeinen
Neste Oil Corporation

harri.turpeinen@nesteoil.com

Biofuels Technology Platform Structure

Biofuels
TECHNOLOGY PLATFORM






Main Challenges

Biofuels Technology Platform

Three main areas of technology development are critical to ensure successful development of biofuels in the EU:

- Feedstock:
  - ✓ managing competition for land resources (food&fodder vs bioenergy) and for different biomass applications (transportation fuels, heat, power, industrial raw materials)
  - ✓ increasing yield per hectare and developing efficient supply logistics
- **Conversion technologies:**
  - ✓ developing ***efficient*** and ***reliable*** biomass to fuel conversion processes with high quality product
- End-use technologies:
  - ✓ optimisation of fuel-engine performance

The winning options (combination of land, feedstock, conversion and end product) will be those best addressing strategic and sustainability targets:

- **high level of GHG reduction with sound management of other key environmental issues (biodiversity, water use, local emissions …)**
- **security and diversification of energy supply for road transport**
- **economic competitiveness and social acceptance**

Key diesel biofuel R&D&D-Priorities I

Biofuels Technology Platform

Conversion processes

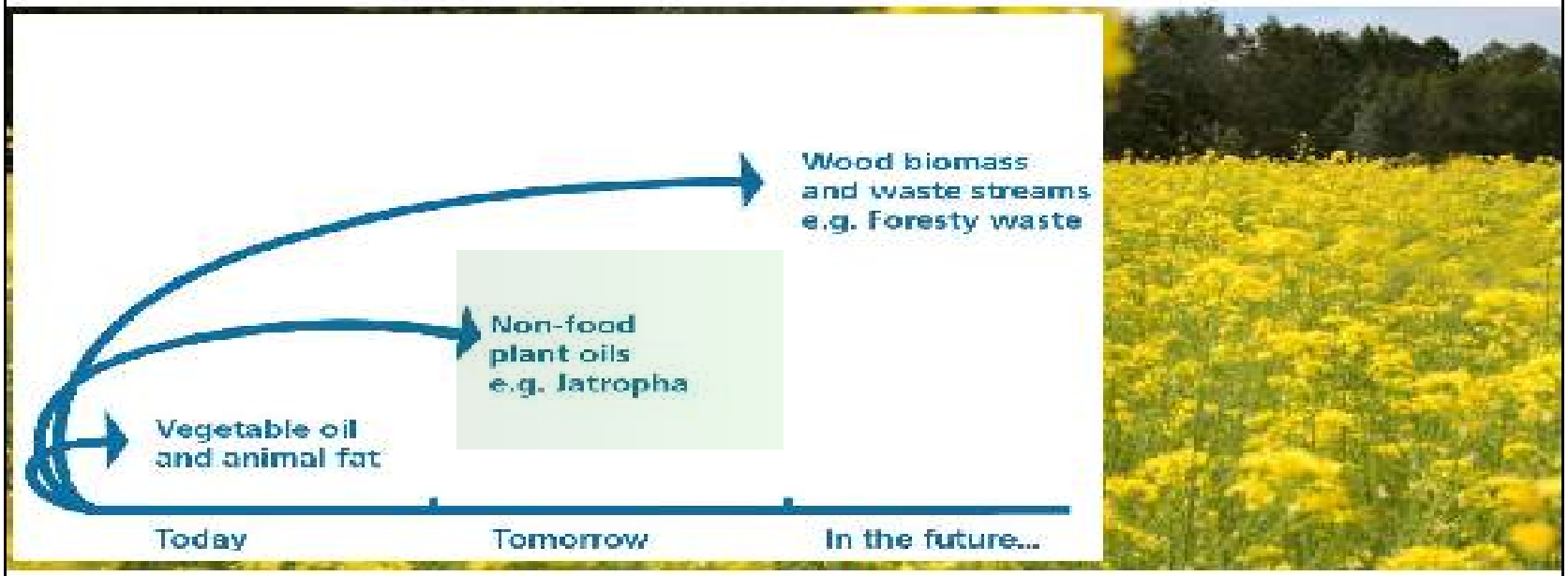
- ✓Improve **current conversion processes** to their **full potential** (biodiesel) for **higher GHG reduction, increased feedstock flexibility and lower cost**
  - ✓Develop **a portfolio of efficient and reliable thermochemical** conversion **processes** for a large spectrum of potential feedstocks
- ✓Develop **integrated biorefinery** concepts making full use of a variety of biomass feedstocks with diversified bioproducts
  - ✓**Demonstrate** at pilot and **industrial scale reliability and performance** of new technologies

Neste Oil example1

NExBTL – raw material base expansion

Next Steps - Get out from the food chain!

NESTE OIL



- Food should not be used as fuel, but
  - that is all we have currently
  - all feedstock should have equal treatment

NExBTL – raw material base expansion

Biofuels Technology Platform

TARGETTING

- to considerably expand triglyseride and fatty acid supply base
- to increase land use efficiency
- to enable utilization of arid land
- to improve GHG-efficiency
- to increase raw material availability
- to improve raw material competitive advantage

- **Through a cooperative effort between Neste Oil and 17 partners**
  - 6 universities and research institutes from Finland
  - 5 universities and research institutes from other EU
  - 6 universities and research institutes from outside EU

Financially supported by TEKES

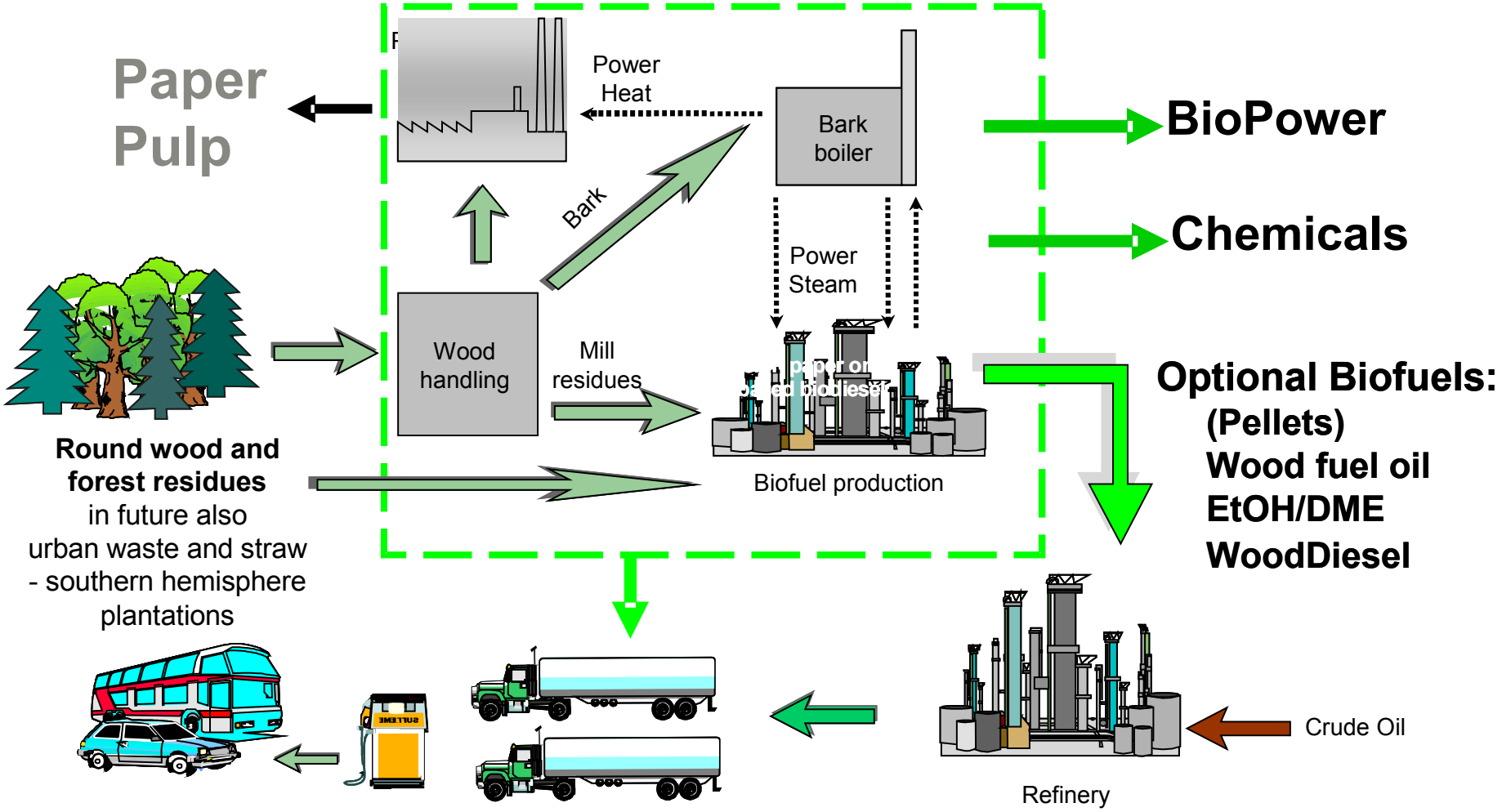
Neste Oil example 2

Neste Oil and Stora Enso to develop 3rd generation renewable diesel

- **Aiming to produce renewable diesel from forest chip raw materials**
- **Demonstration plant at Stora Enso's Varkaus Mill in Finland**
  - **develop technology for purification of syngas to be used in Fischer Tropsch process**
  - **in operation 2009**
- **Commercial plant development in the second phase**
  - **after successful testing period**
- **Combines expertise of Neste Oil, Stora Enso, and VTT** (the Technical Research Centre of Finland)
- **Financial support from TEKES and Ministry of Employment and the Economy**

Biofuel production in connection to P&P mill

Biofuels Technology Platform



Source: VTT

Thank you!

Mailto:harri.turpeinen@nesteoil.com