Neste Oil Corporation & NExBTL Renewable Diesel

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On behalf of Neste Oil

California Air Resources Board
Workshop on Regulatory and Non-Regulatory Fuels-Related Activities
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NESTE OIL

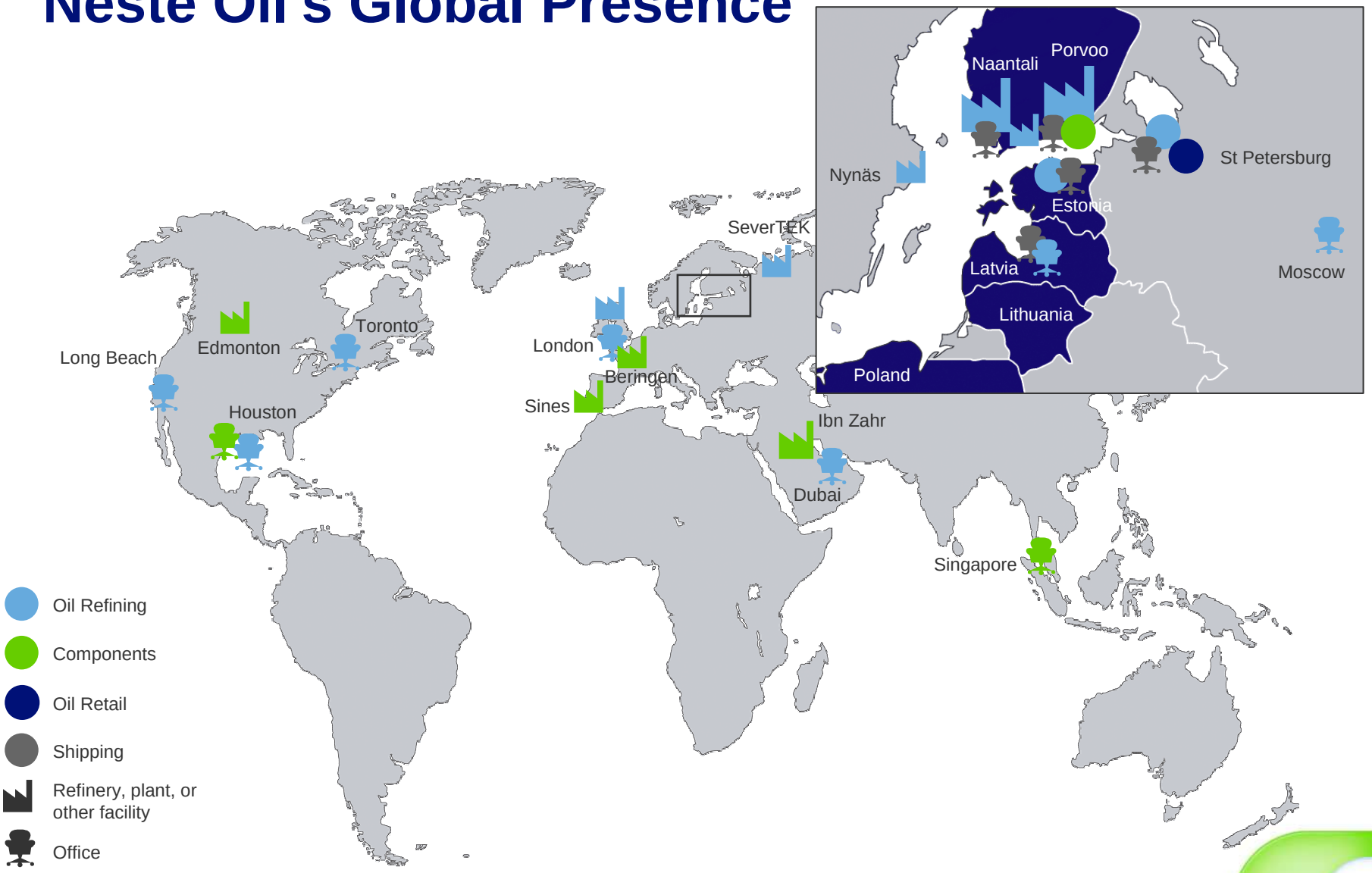
Neste Oil

Neste Oil, a leading independent Northern European refining company, is focused on high quality petroleum products for cleaner traffic and committed to global growth of renewables.

Refining capacity	**270,000 bpd = 14 Mt/a**
Employees	**4,300**
Sales	**USD 11 billion/a**

US HQ in Houston, Texas
California Facilities:
Sales Office in Long Beach, CA and
Isooctane production in Edmonton, Canada

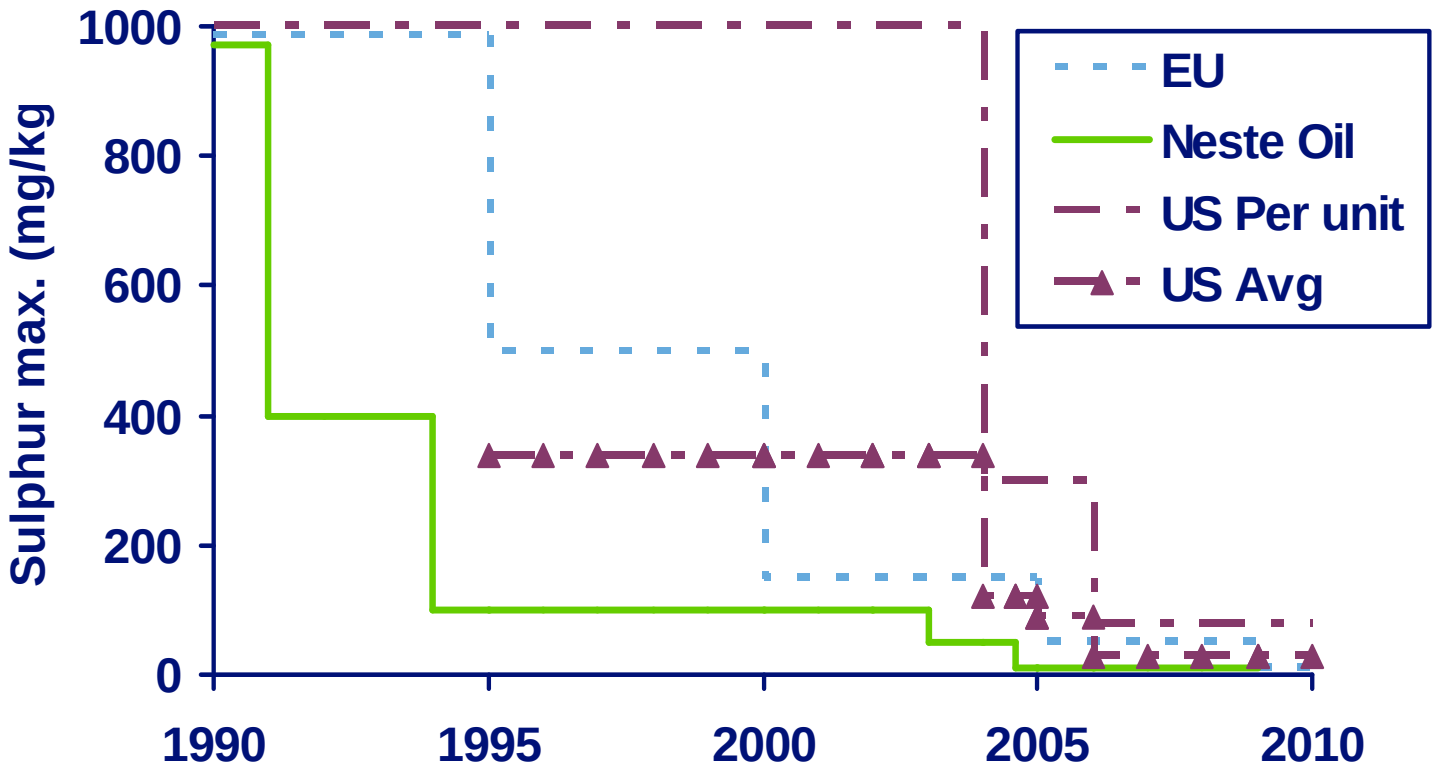
Neste Oil's Global Presence



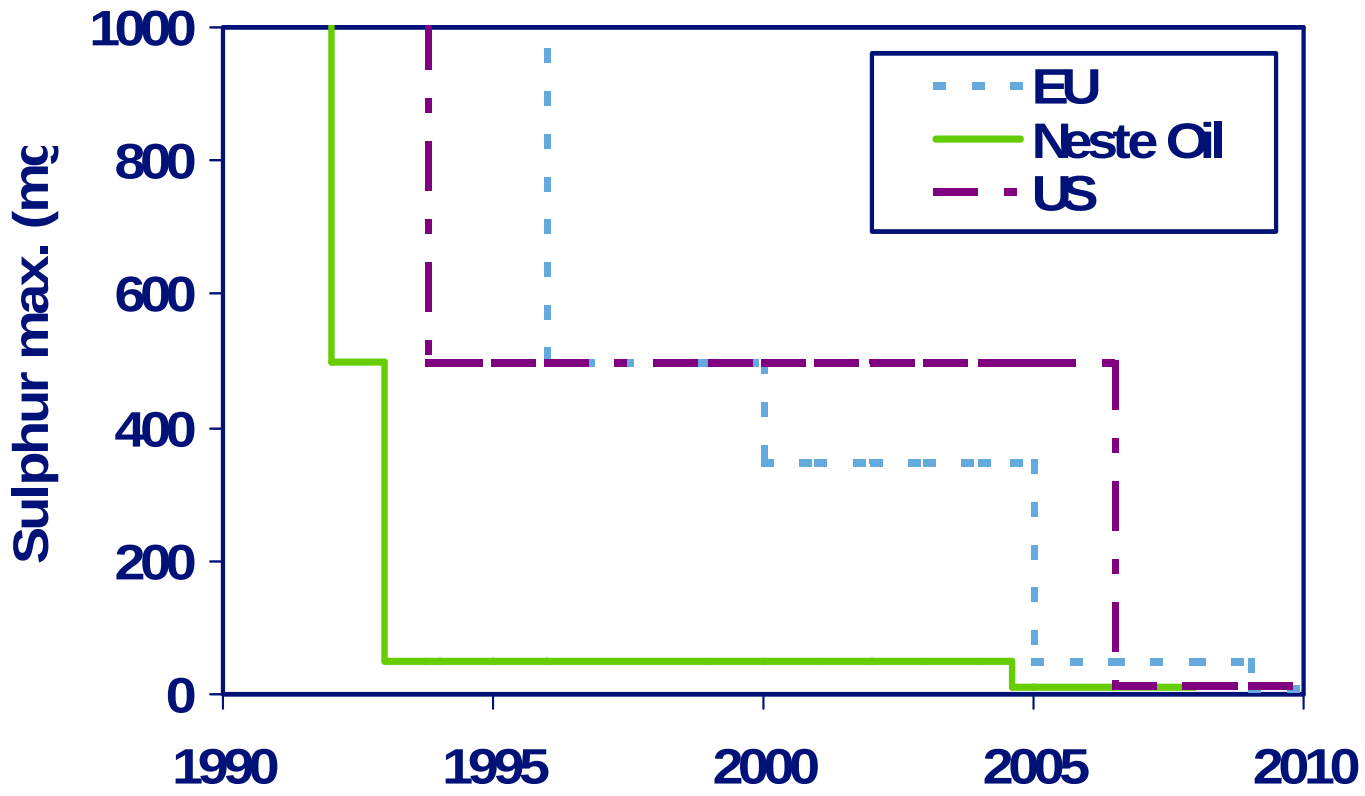
Leadership Commitment to the Environment

- First oil company to require double bottom ships
- Forerunner in reducing sulfur in diesel and gasoline
- All exported fuels are Ultra Low Sulfur
- Among the first to deliver reformulated gasoline to the United States, including reformulated gasoline to California
- Developed proprietory technology to produce isooctane
- First to convert MTBE plant to isooctane, enabling California's shift from MTBE a year early
- Started construction on a ultra high quality renewable diesel production unit utilizing NExBTL technology

Neste ahead of EU & US Gasoline Sulfur Limits



Neste ahead of EU & US Diesel Sulphur Limits



Investing in Renewable Diesel at Porvoo

- New NExBTL plant under construction at the Porvoo refinery
- Capacity: 170,000 t/a (~3750 bpd, 60 million gpy)
- Due for start-up in summer 2007
- Investment valued at approx. €100 million
- Based on Neste Oil's proprietary process know-how
- Renewable raw materials: vegetable oils and animal fats
- Tests show product has excellent properties and low emissions
- Designed to meet growing European demand for biofuels
- EU approves NExBTL renewable diesel as certified EU diesel fuel
- NExBTL technology can help America too

NExBTL, A 2nd Generation Renewable Diesel

Exceptionally high quality diesel fuel made from on purpose or byproduct vegetable oils and/or animal fats

- **Renewable, pure hydrocarbon fuel**
- **Superior diesel blending component**
- **Fits into existing infrastructure- no incremental costs**
- **No storage stability problems**
- **Excellent performance in cold climates**
- **Very high cetane number (84 ... 99)**
- **Free of aromatics, sulfur, oxygen**
- **Reduces exhaust emissions**
- **Less fossil CO_2 than fossil diesel fuel**

Fuel Property comparison

	NExBTL	GTL	FAME (RME)	Sulfur free Diesel fuel (summer)
Density at +15℃ (kg/m ^{3})	775 ... 785	770 ... 785	≈ 885	≈ 835
Viscosity at +40℃ (mm ^{2}/s)	2.9 ... 3.5	3.2 ... 4.5	≈ 4.5	≈ 3.5
Cetane number	≈ 84 ... 99 *	≈ 73 ... 81	≈ 51	≈ 53**
Cloud point (℃)	≈ - 5 ... - 30	≈ 0 ... - 25	≈ - 5	≈ - 5
Heating value (lower) (MJ/kg)	≈ 44	≈ 43	≈ 38	≈ 43
Heating value (MJ/l)	≈ 34	≈ 34	≈ 34	≈ 36
Polyaromatic content (wt-%)	0	0	0	≈ 4
Oxygen content (wt-%)	0	0	≈ 11	0
Sulfur content (mg/kg)	< 10 (< 1)	< 10	< 10	< 10
Carbon / hydrogen	≈ 5.6	≈ 5.6		≈ 6.0

*) Blending cetane number
**) ASTM specification > 40

NExBTL production unit

Bio Oil

Feed tank

Production start 2007 in Porvoo

Pretreatment
Impurities removal

Hydrogen

NExBTL-Process
Conversion of fatty acids to diesel fuel

Stabilization

Bio fuel gas

Water

Bio gasoline

Mineral oil diesel

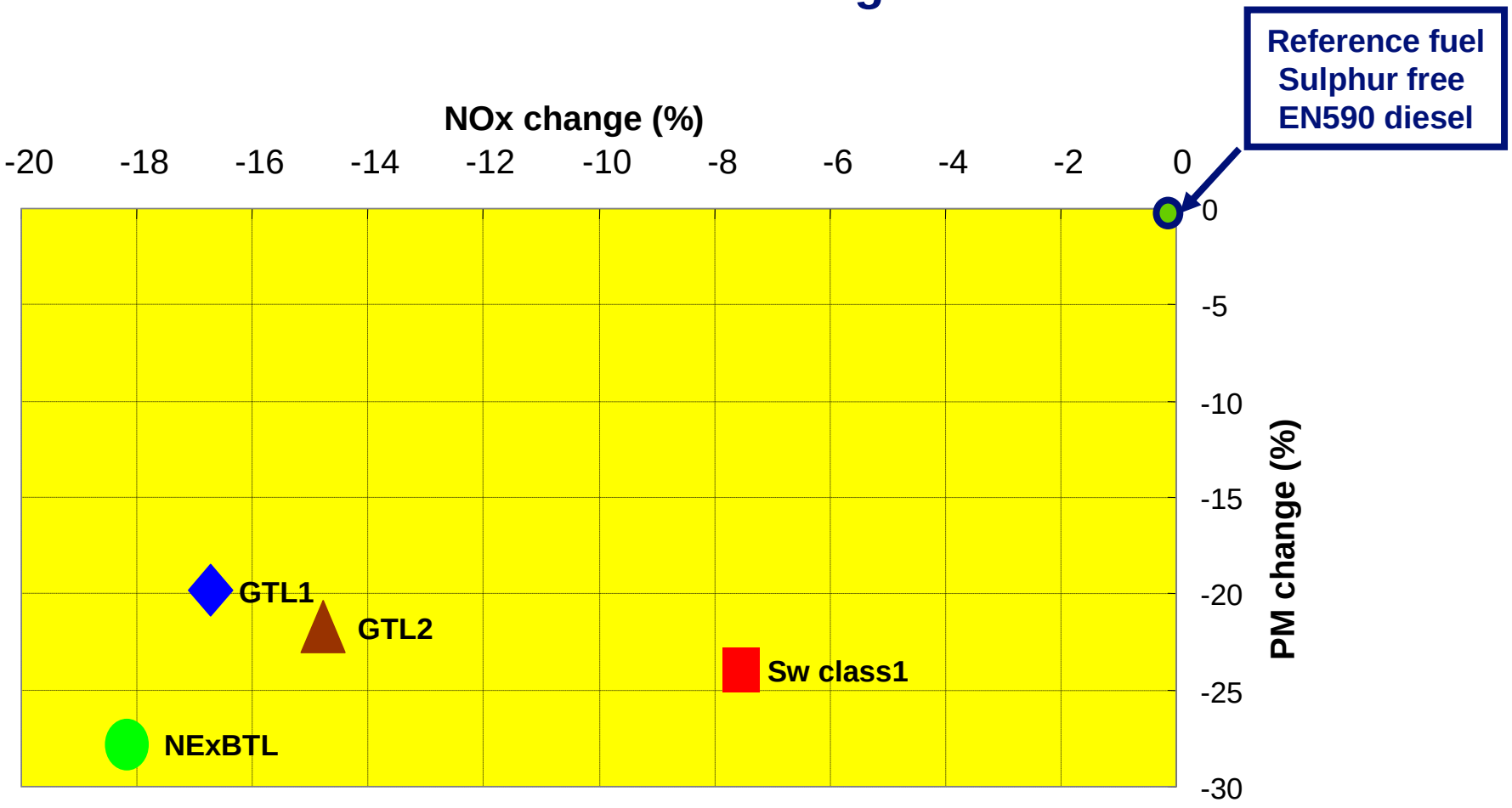
Component tank

Diesel tank

Diesel + Biodiesel Blends

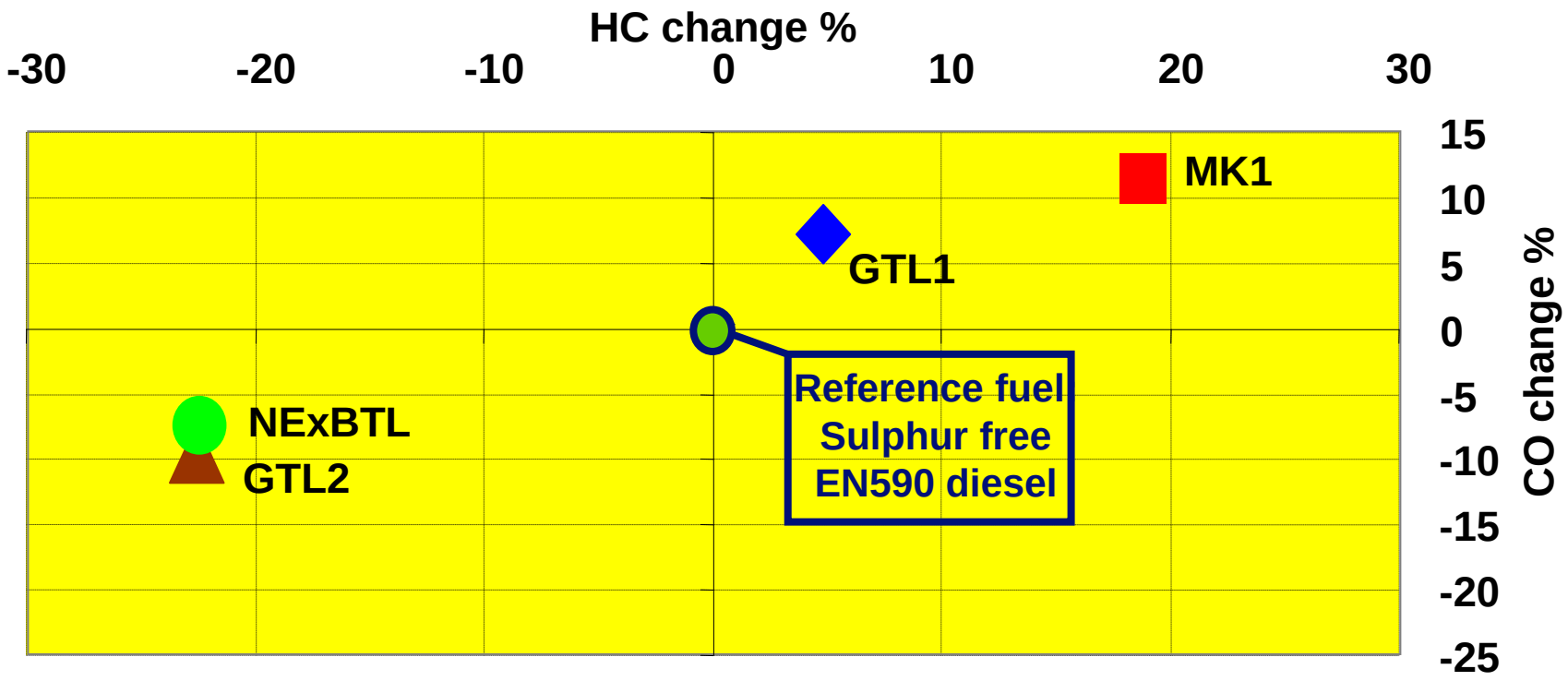
NExBTL component sales

NOx and PM Emissions in Truck Engines



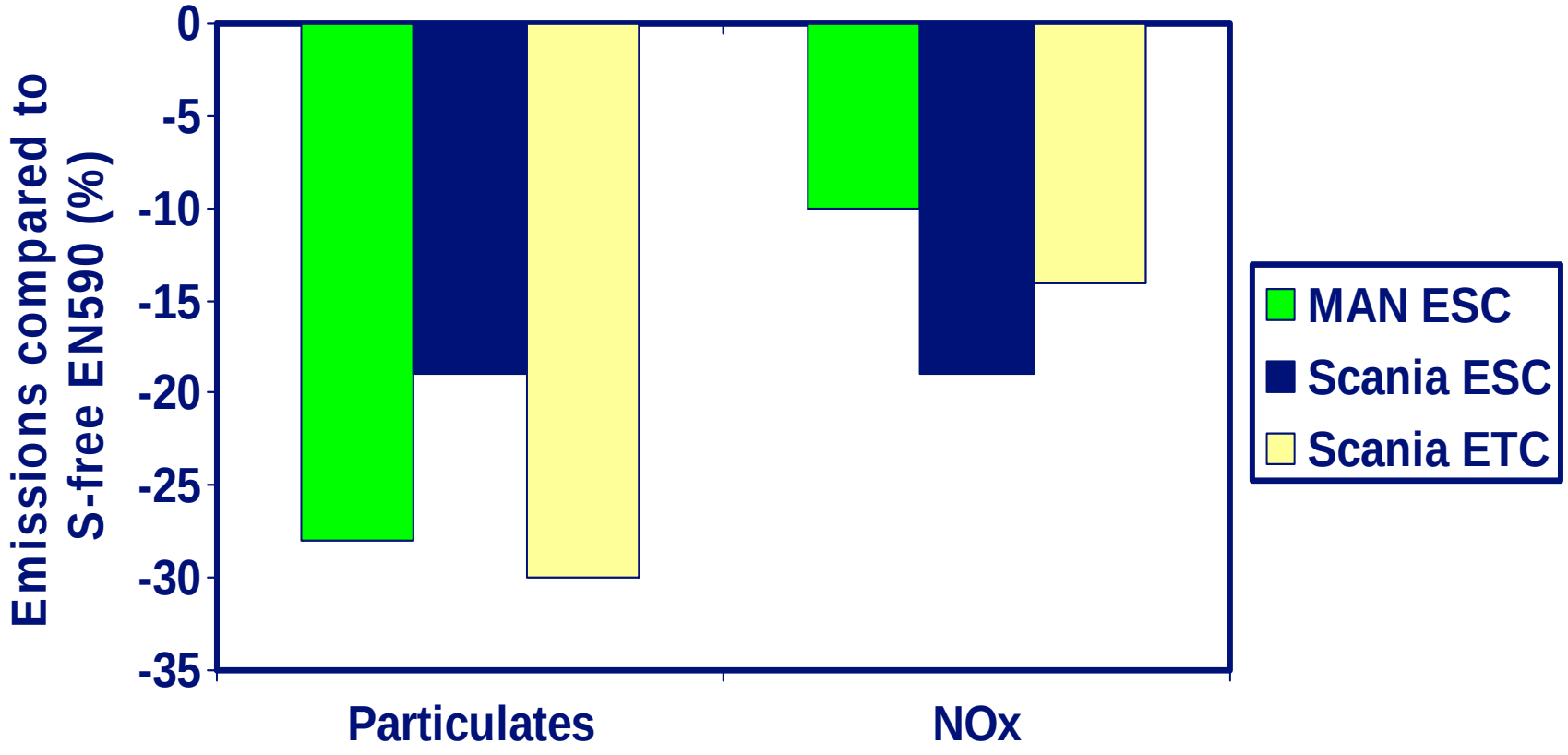
Source: Scania NMEC / 5th International Colloquium Fuels / Jan 12, 2005
Averages of all tests with Scania Euro 4 engine

HC and CO Emissions in Truck Engines



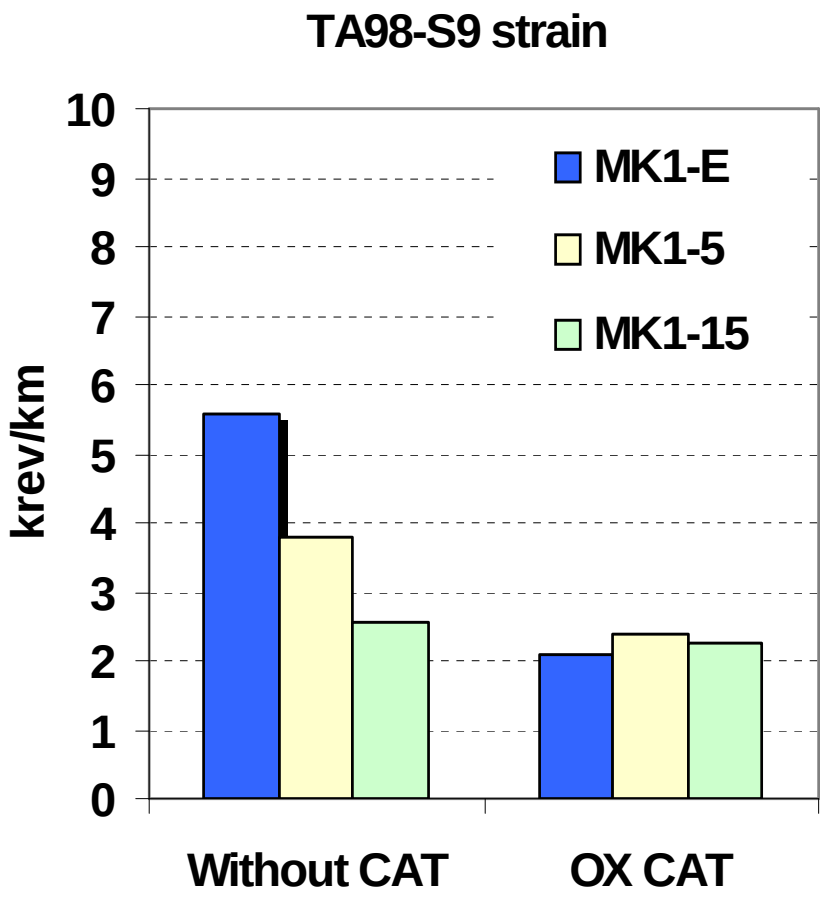
Source: Scania NMEC / 5th International Colloquium Fuels / Jan 12, 2005
Averages of all tests with Scania Euro 4 engine

Exhaust emissions of NExBTL in truck engines



ESC = European steady state cycle
ETC = European transient cycle

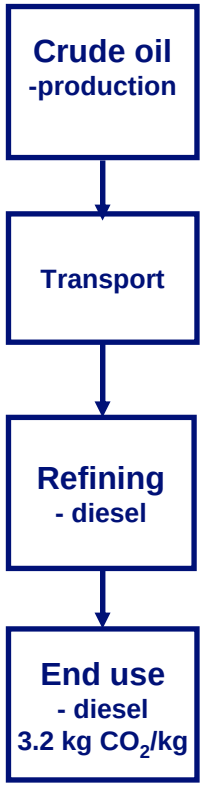
NExBTL reduces Mutagenicity



- Adding NExBTL to Swedish MK1 almost as effective as oxidation catalyst
- Could benefit older technology vehicles

$CO_{2equiv.}$ Emissions / kgoe fuel

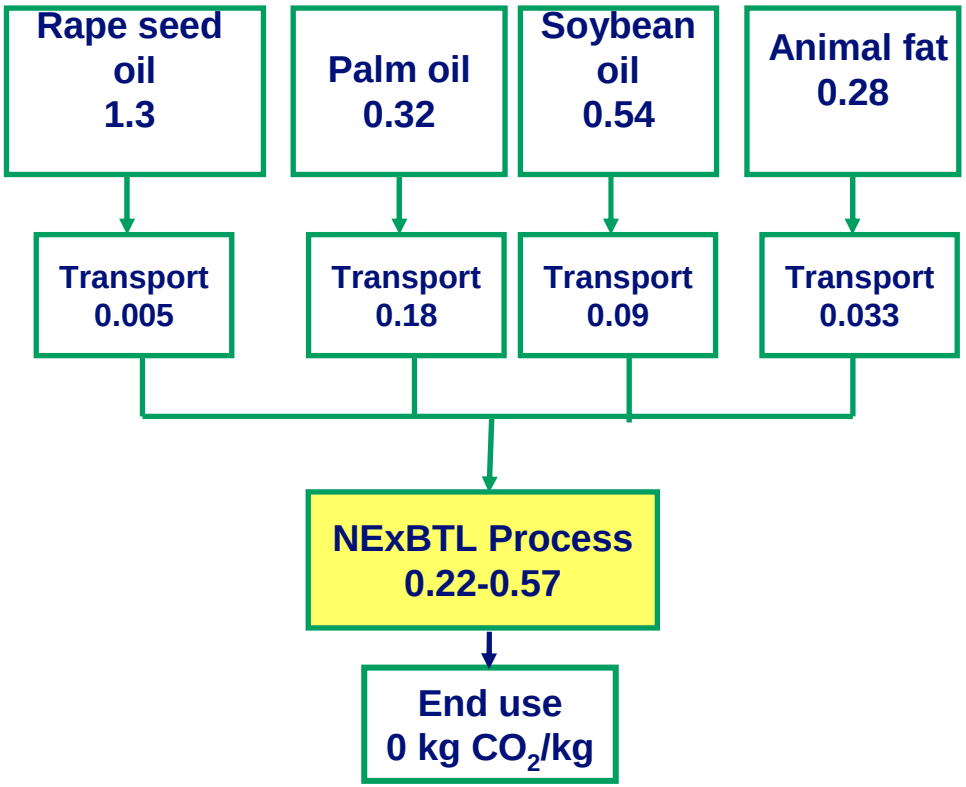
Fossil diesel



∑ 3.8 kg CO_2/kgoe fuel

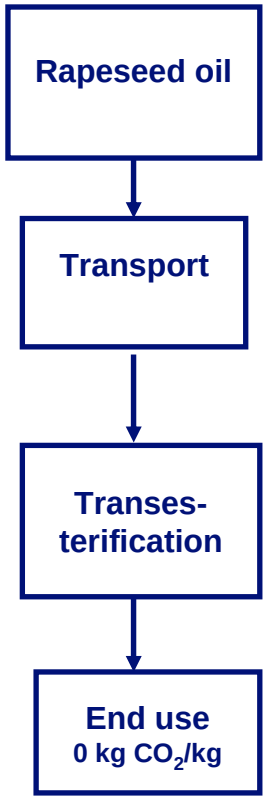
Source: Concawe/Eucar WTW 2004

NExBTL diesel



∑ 0.5 - 1.5 kg CO_2/kgoe fuel

Biodiesel



∑ 1.6 - 2.3 kg CO_2/kgoe fuel

Source: Concawe, Shell, WTW

kgoe = kilogram oil equivalent (NExBTL 44, RME 38 MJ/kg)

Economics

- Competitive with other renewable diesel technologies
  - Feedstock flexibility,
  - Product yields,
  - Product quality (cetane, nano-sulfur (<1ppm), stability, cloud, etc.)
  - Full compatibility with distribution and consumption infrastructure
  - Offset investment costs
- All it needs are:
  - Its feedstock receive the same subsidies as its competitor's feedstock
  - Specifications that allow its use

Specifications considerations

- NExBTL is a diesel component – It is like isooctane for diesel
- Its maximum concentration is diesel should be limited by ASTM D-975 Diesel Fuel specifications.
  - Most properties improve. Except
  - Like most ULSD products lubricity additives are recommended.
- Because it is paraffins, its presence does not limit the use of biodiesel meeting ASTM D-6751 specifications.
- It increases the potential renewability of diesel.
- As regulators consider the use of renewable diesel fuel components they need to avoid specifications that accidentally prohibit the use of innovative second generation renewable diesel components.

CONCLUSIONS

NExBTL is a 2nd generation Renewable Diesel That Combines the benefits of GTL-diesel and Biodiesel

- Premium fuel properties like GTL
- Reduces exhaust emissions like GTL (or even lower)
- Fits existing infrastructure and engines
- CO_2 savings like Biodiesel (or even more)
- Renewable-reduces oil dependence

- **Offers feedstock diversity**
  - Waste animal fat
  - Soy, corn, canola, rape and other vegetable oils
- **Provides a cleaner more energy efficient future**
- **California needs to keep the door open to 2nd generation renewable fuels like NExBTL**


NExBTL reaffirms Neste's strong environmental commitment.
Neste seeks quality partnerships in ensuring Renewable Diesel's role in the Renewable Fuels Market.