

Neste Oil Corporation & NExBTL Renewable Diesel

Cal Hodge
President, A 2nd Opinion, Inc.
On behalf of Neste Oil

California Air Resources Board
Workshop on Regulatory and
Non-Regulatory Fuels-Related Activities
Sacramento, CA
February 14, 2006

NESTE OIL

refining the future

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

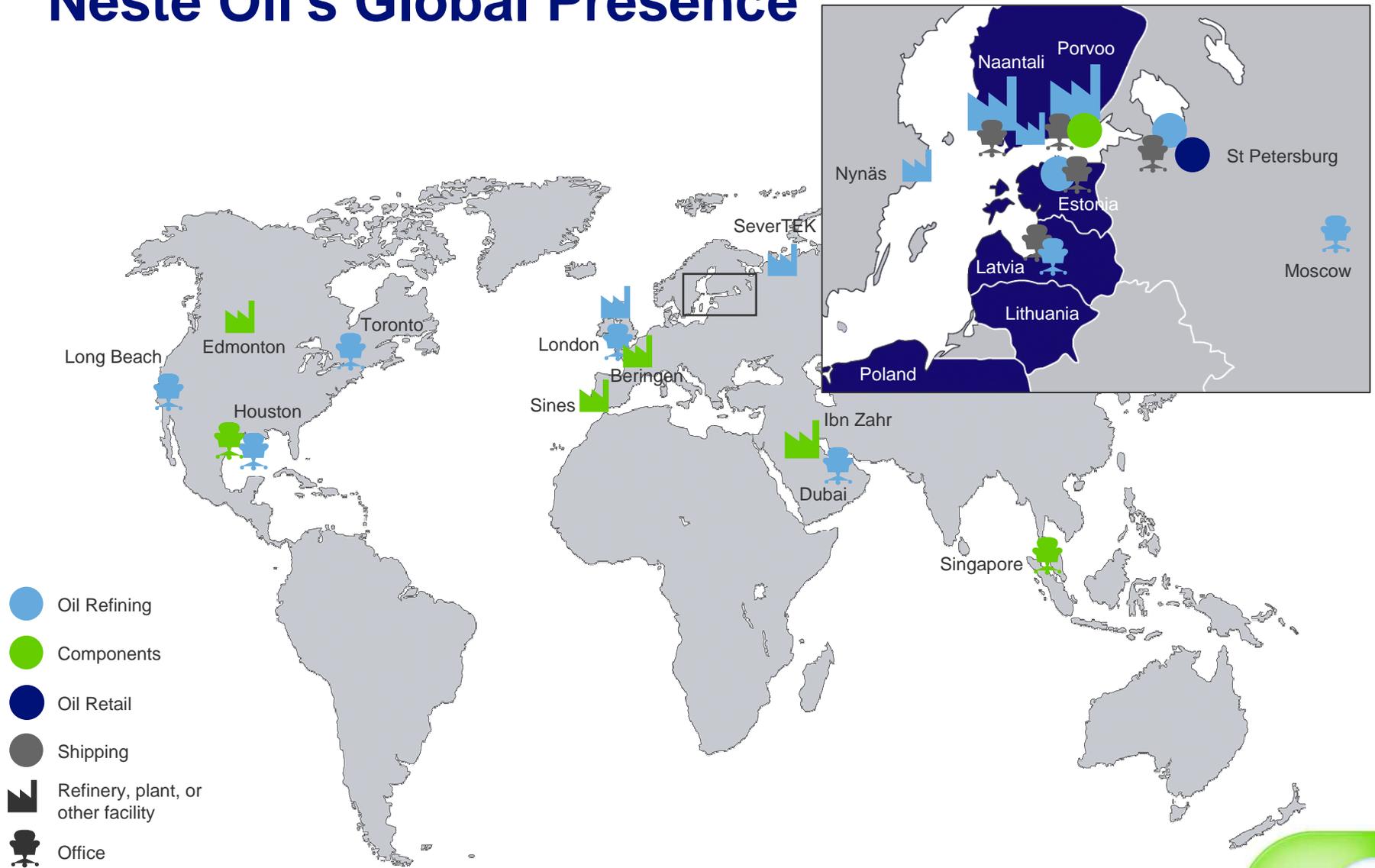
California Facilities:

Sales Office in Long Beach, CA and

Isooctane production in Edmonton, Canada



Neste Oil's Global Presence

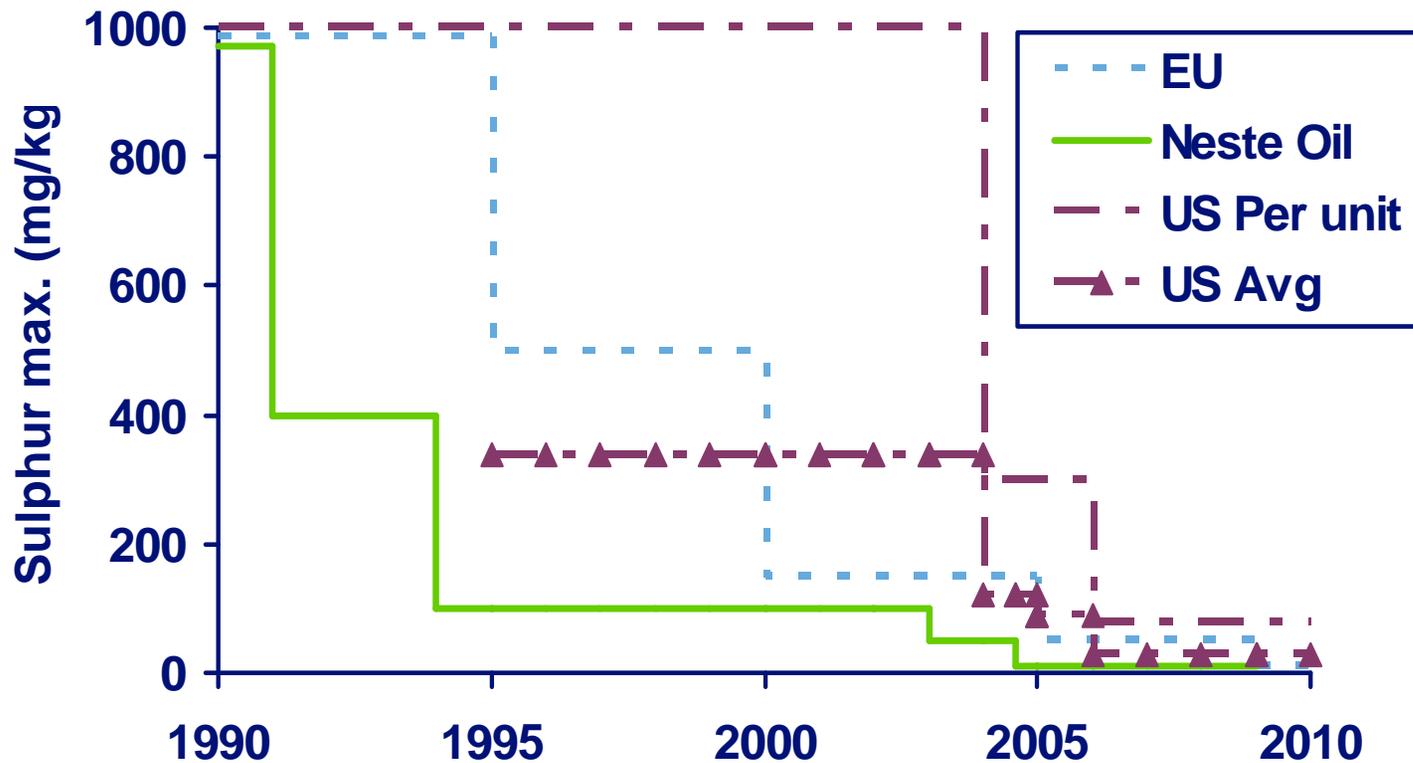


Leadership Commitment to the Environment

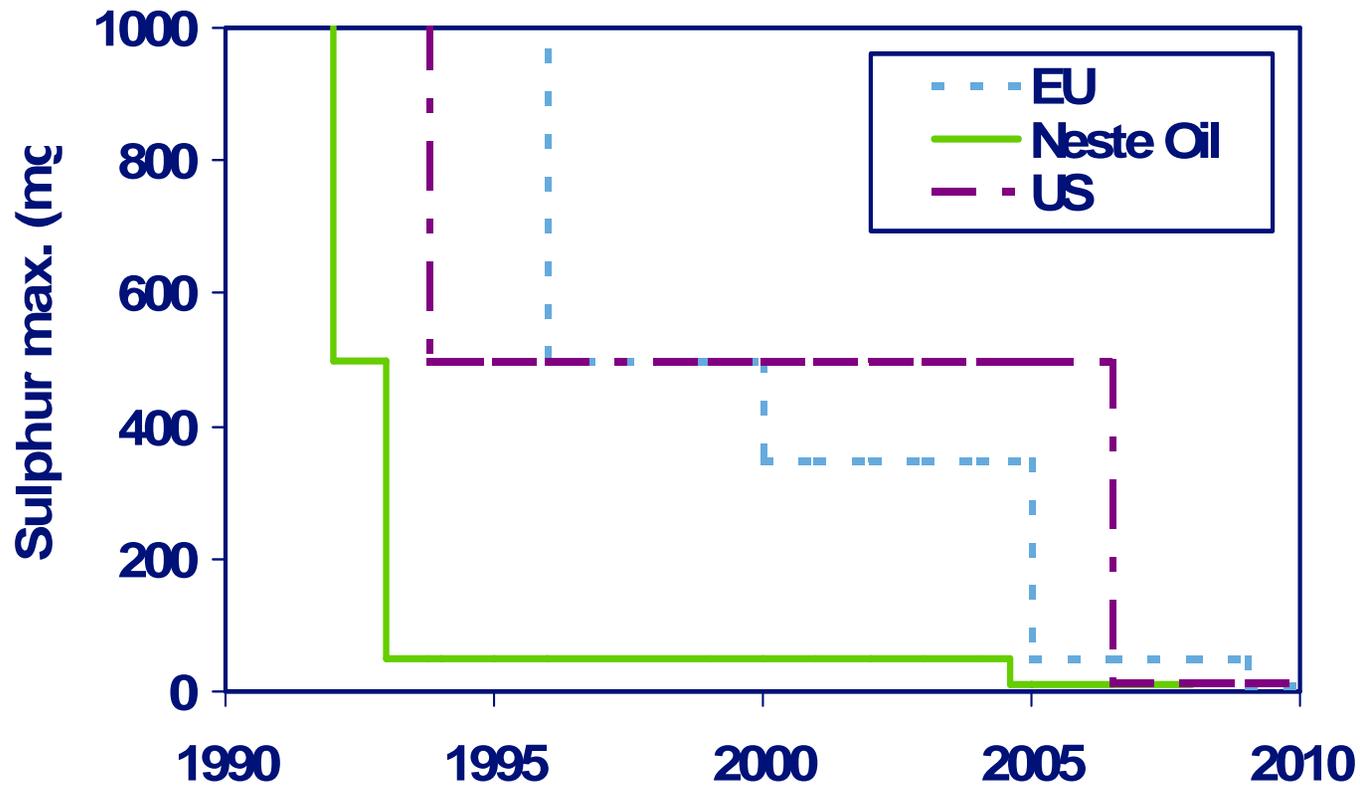
- **First oil company to require double bottom ships**
- **Forerunner in reducing sulfur in diesel and gasoline**
- **All exported fuels are Ultra Low Sulfur**
- **Among the first to deliver reformulated gasoline to the United States, including reformulated gasoline to California**
- **Developed proprietary 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 CO₂ than fossil diesel fuel**



Fuel Property comparison

	NExBTL	GTL	FAME (RME)	Sulfur free Diesel fuel (summer)
Density at +15°C (kg/m ³)	775 ... 785	770 ... 785	≈ 885	≈ 835
Viscosity at +40°C (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 (°C)	≈ - 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

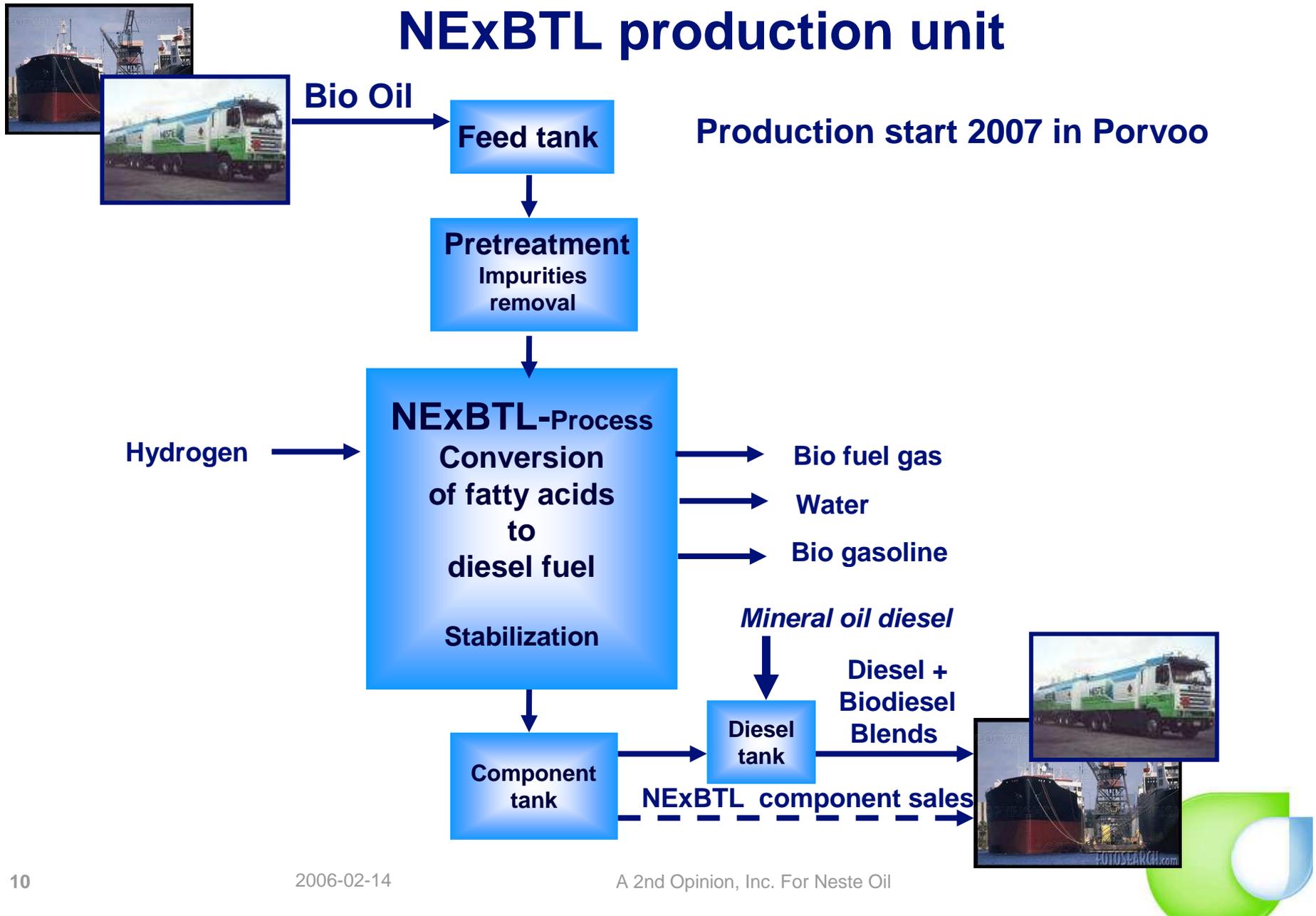
*) Blending cetane number

***) ASTM specification > 40

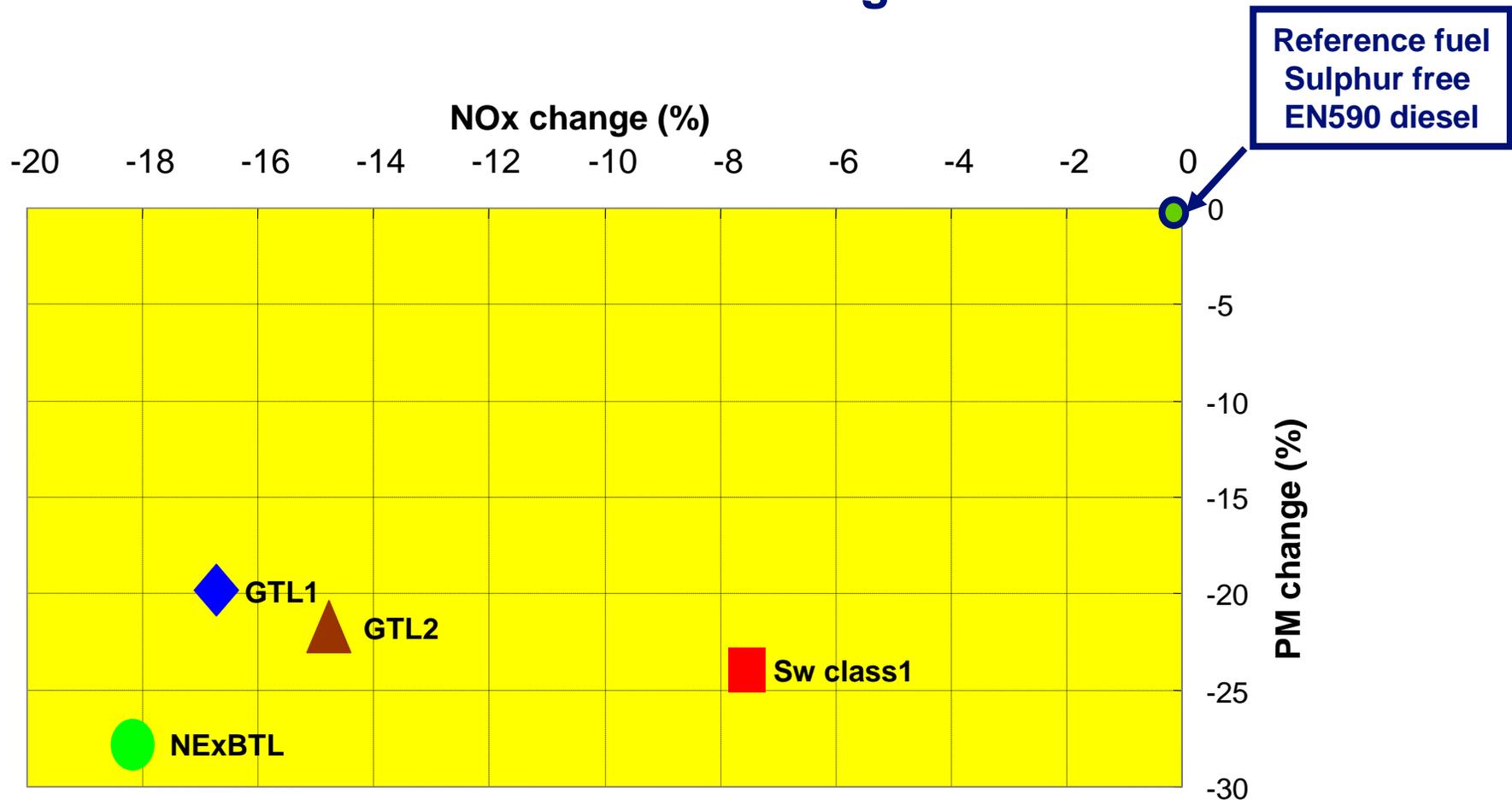


NExBTL production unit

Production start 2007 in Porvoo



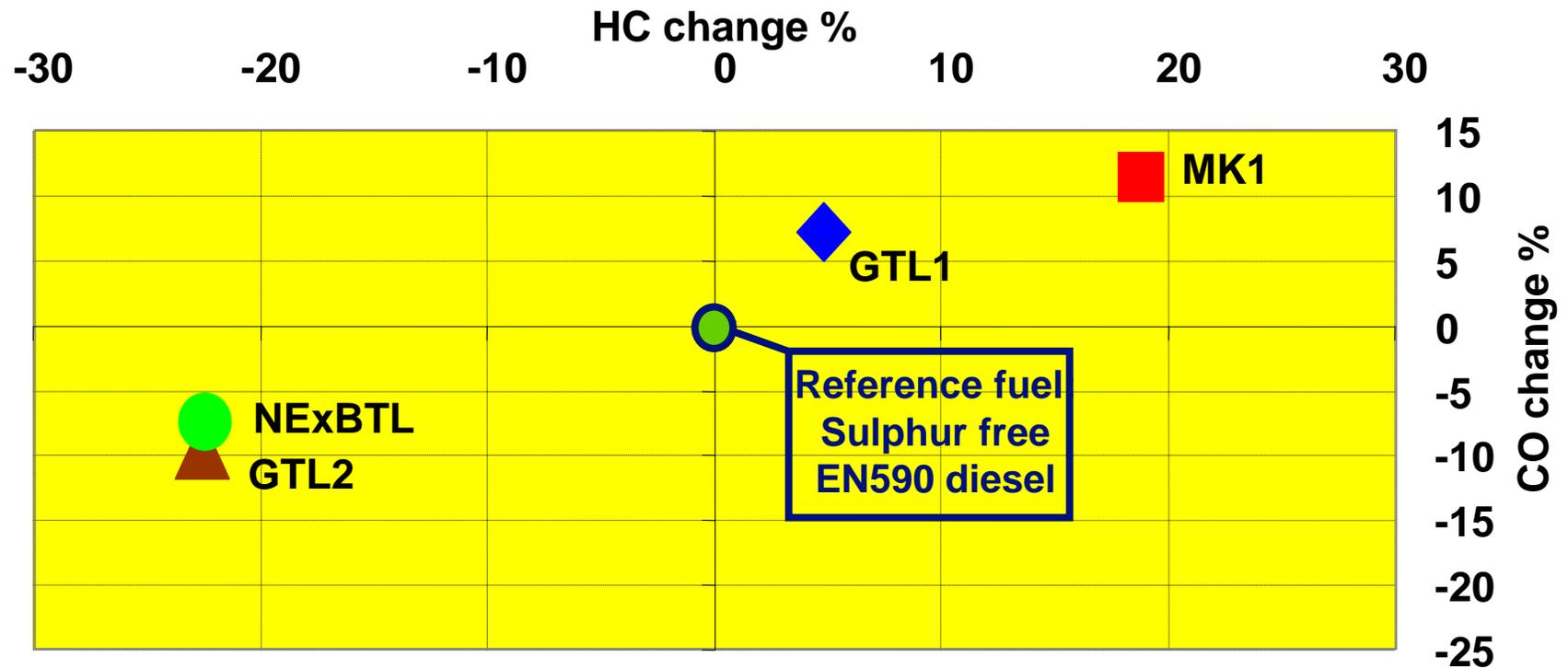
NOx and PM Emissions in Truck Engines



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



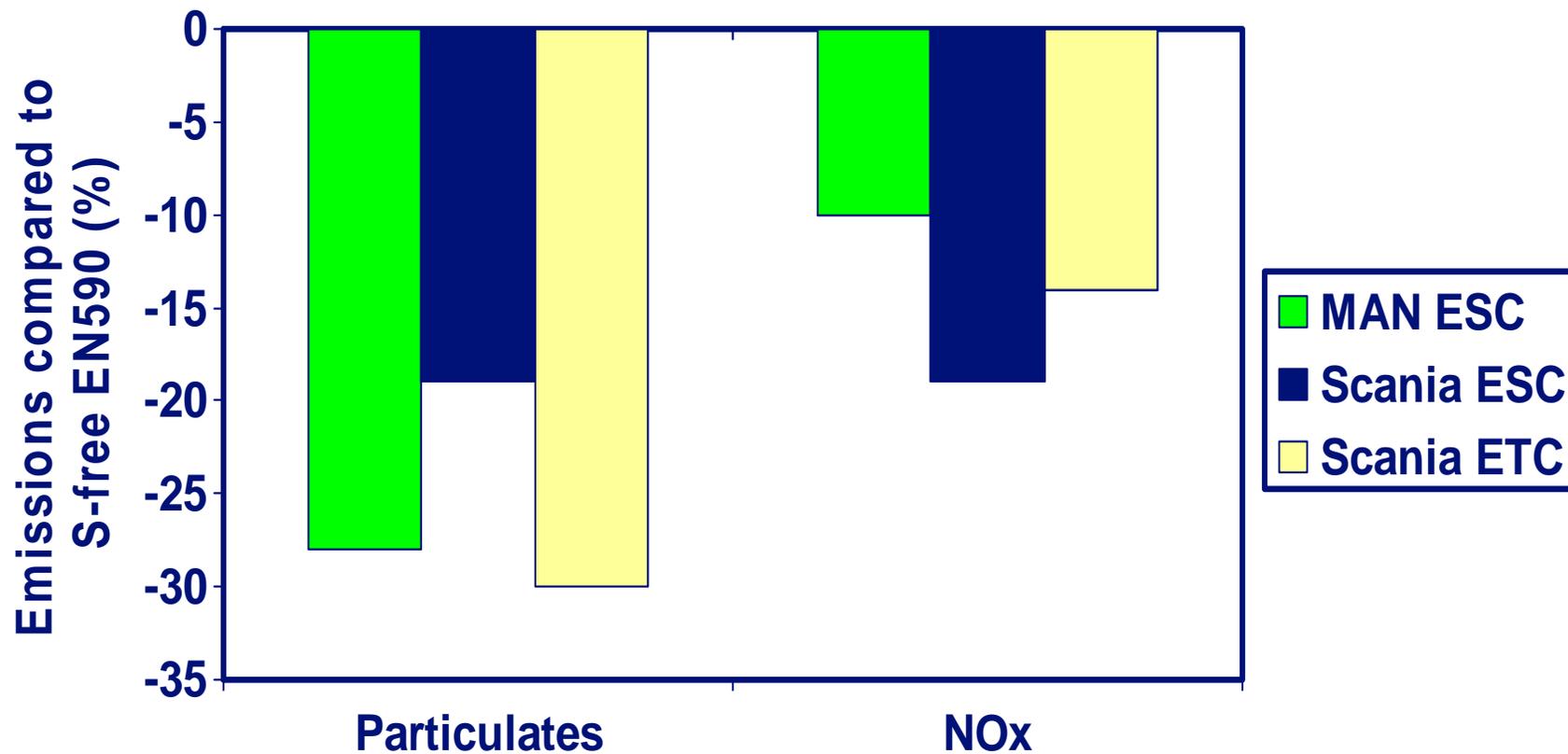
HC and CO Emissions in Truck Engines



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

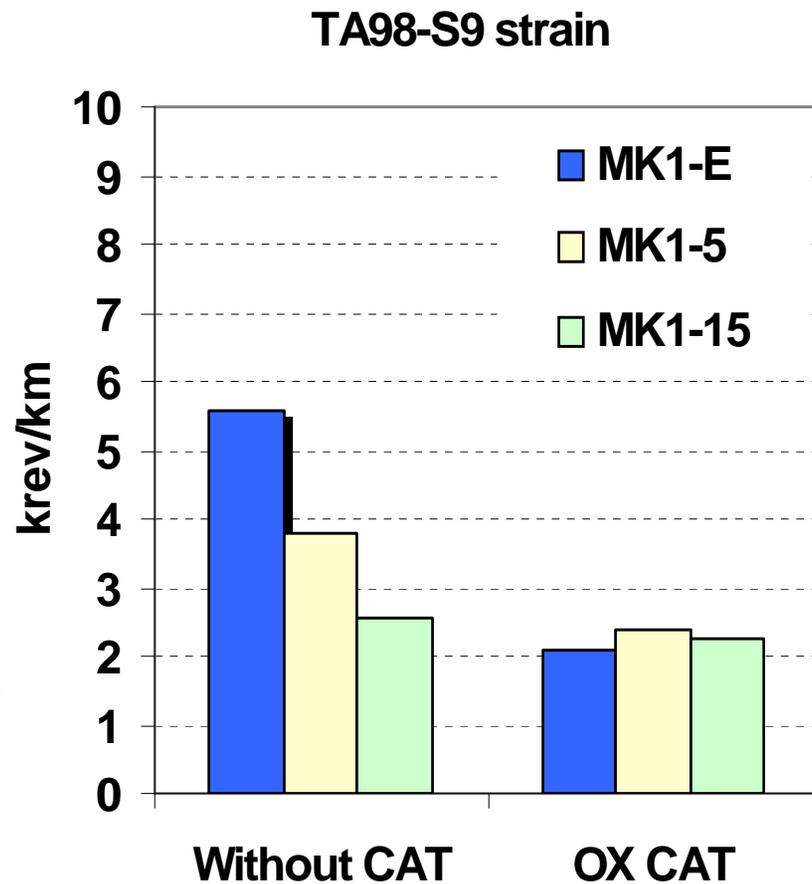


ESC = European steady state cycle
 ETC = European transient cycle



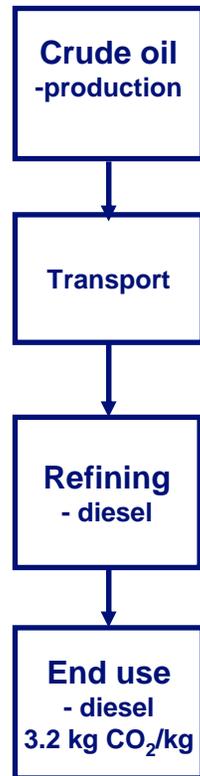
NExBTL reduces Mutagenicity

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



CO₂equiv. Emissions / kgoe fuel

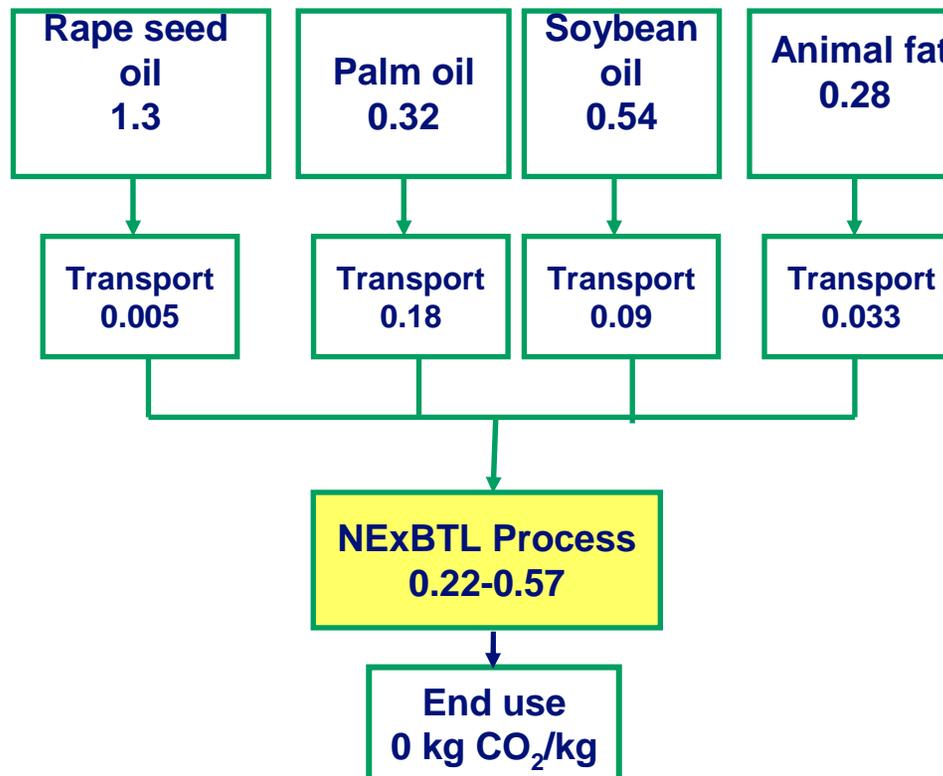
Fossil diesel



Σ 3.8 kg CO₂/kgoe fuel

Source: Concawe/Eucar
WTW 2004

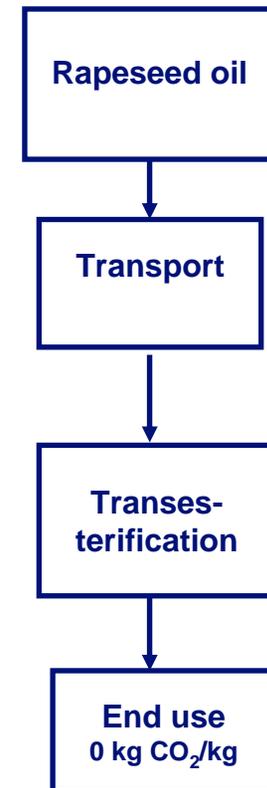
NExBTL diesel



Σ 0.5 - 1.5 kg CO₂/kgoe fuel

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

Biodiesel



Σ 1.6 - 2.3 kg CO₂/kgoe fuel

Source: Concawe, Shell, WTW



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 in 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
- CO₂ 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.

