

Economic Viability of Biodiesel production from Oilseed Rape



Dr Elaine Booth

Jim Booth

Consultancy Services Division

- Drivers for biofuels
- Liquid biofuel types
- Technology and biofuel examples
- Costings
- Farm scale production
- Conclusions



What is driving the interest in biofuels ?



- Environment
 - Kyoto agreement
 - UK Energy White Paper
- EU Targets
 - biofuels should achieve 2% of transport fuels by 2005 and 5.75% by 2010 (UK currently at 0.3%)

Drivers for biofuels (2)

- UK Renewable Transport Fuel Obligation
 - proposed start 2008, 5% by 2010
- Cost and availability of mineral fuel
 - High crude oil and resulting fuel prices
 - Limited reserves of crude oil

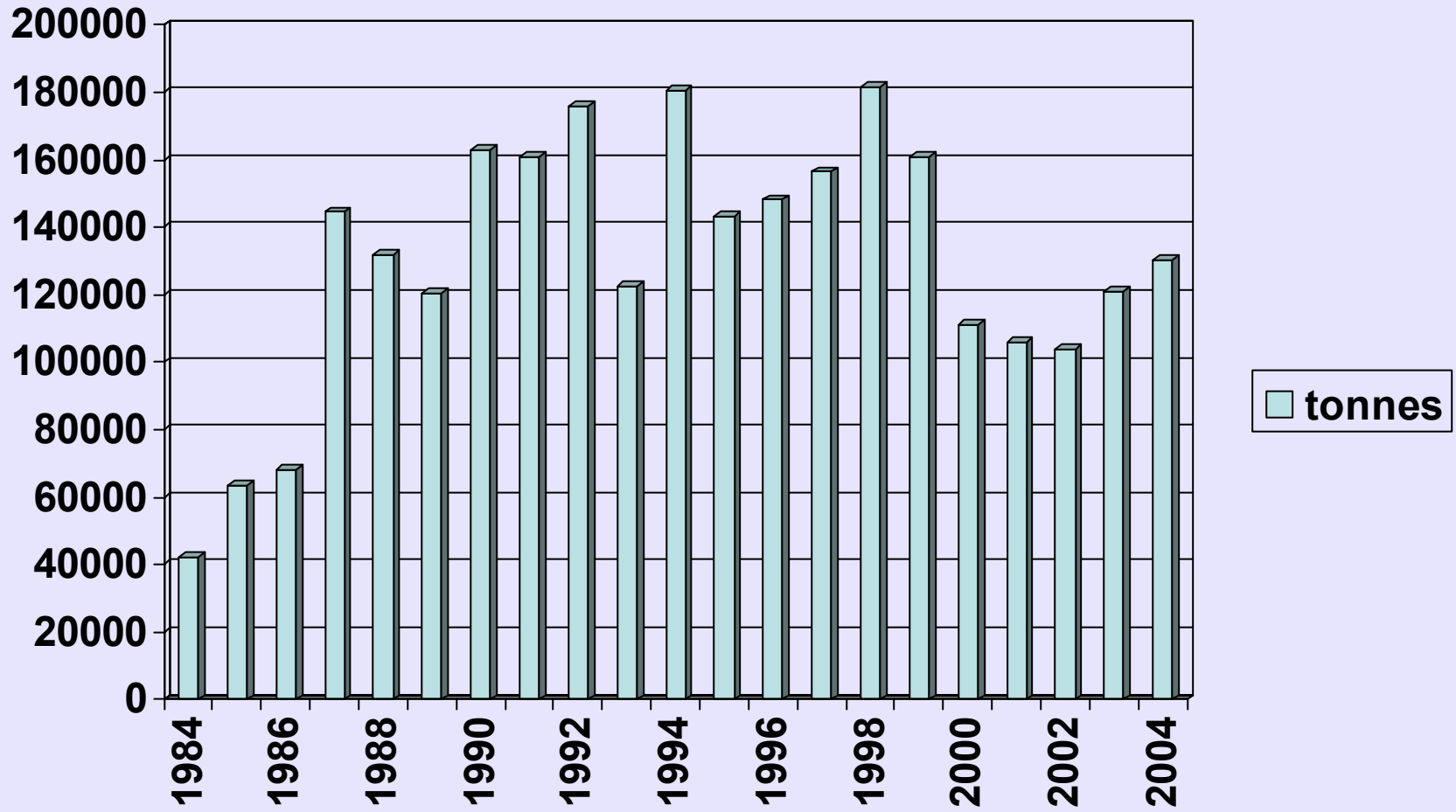


Liquid biofuel types

- Bioethanol
 - from starch/sugar crops
 - eg cereals, potatoes, sugar beet
- Biodiesel
 - from oil crops
 - waste cooking oil (UCO)
 - Tallow



Oilseed rape production in Scotland



Oilseed rape's place in the Scottish arable sector



- Favourable growing conditions - highest average yields in Europe
- High oil contents due to Northern latitude
- Low glucosinolate contents due to low atmospheric deposition of sulphur
- One of few break crops for Scotland
 - yield advantages and earlier entry for following wheat (and lower N requirement)
 - opportunity to spread labour
 - benefits soil structure, allows control of grass weeds and reduces disease build-up

Processing required; rapeseed to biodiesel



Rapeseed



crushing

Crude oil

&

rape meal

(→ animal feed)



esterification (add methanol in presence of catalyst)

Biodiesel

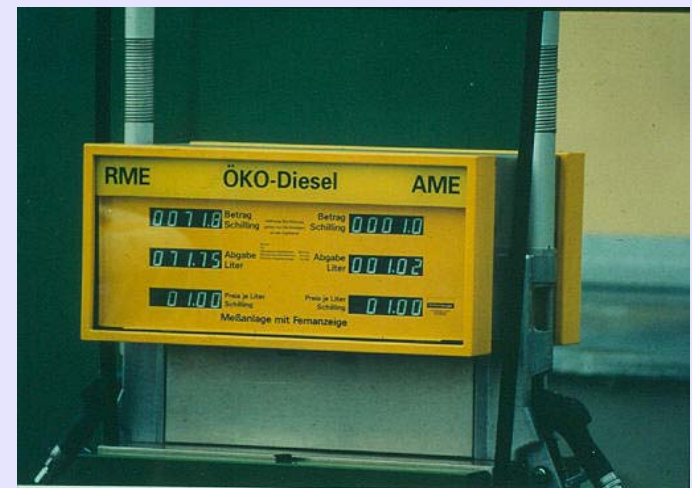
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glycerol

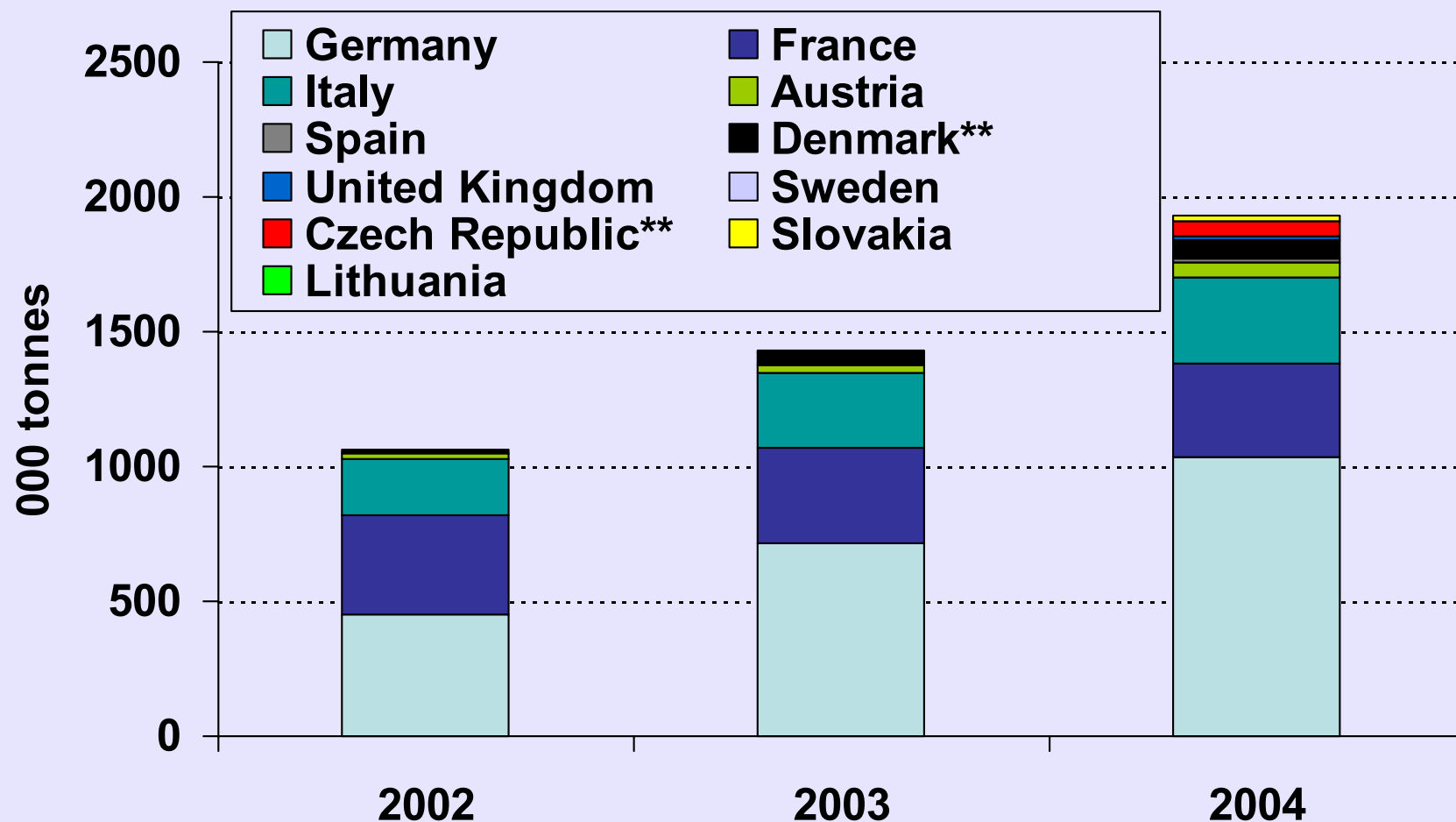
(→ petrochemical industry)

Use of rapeseed oil as biofuel

- Biodiesel eg Germany, Austria
 - removal of glycerol from vegetable oil prevents engine ‘coking’
 - biodiesel can be used as a diesel substitute or blend in **unmodified** diesel engines
 - frequently included as 5% blend to fit with engine warranties



EU-25 Biodiesel Production



Source: UFOP & VBD

Economic framework for biodiesel production in Scotland



- Currently there is no crusher in Scotland
- There is an esterification plant - Argent - but it utilises used cooking oil and tallow only
- Scottish OSR prices lowest in UK
- Biodiesel production more expensive than mineral diesel
- Economics of scale in crushing and esterification are important
- Government unlikely to move from 20p/l tax rebate (fuel duty 47.1p or 27.1p biofuels)
- Adoption of RTFO will create demand

Fuel Duty on main UK Transport Fuels

Product	Duty Rate (p/l)
Petrol (ULS)	47.10
Diesel (ULS)	47.10
Regular Diesel	53.27
Biodiesel	27.10
Biodiesel (off road)	3.13
Red Diesel	5.22



Source: HM Revenue & Customs

Commercial opportunity



- Medium scale plant (60,000t OSR) + Esterification (+ 10,000t oil) - produces 33ML of biodiesel
- 14% return with pay-back by year 6.
- Considerable inherent risks involved
- Best mitigated through formation of a joint-venture company
- Brand biodiesel and blend at higher rate (>5%) to differentiate

Are farm small plants viable?

Possible things which will help:

- Grants (FBDS) to reduce capital cost
- utilise existing infrastructure
- use own OSR, save haulage (£10/t)
- Feed rapemeal own livestock – higher value
- Labour costs - share
- EU Energy Crop supplement €45/ha

- Biodiesel more expensive to produce than mineral diesel, however with 20p/l fuel duty rebate can compete
- RTFO is the key - will create instant demand for biofuel
- This demand can either be met by imported or domestic biofuel
- medium scale plant of 60,000t OSR is viable
- small-scale plants are expensive - so need to look at costs carefully

Conclusions

- Farm scale production need to consider ways to reduce production costs - pilot studies
- Must meet legal obligations from HM Customs & Revenue, SEPA, HSE.

