



UK Biofuels – industry overview

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Xyntéo and GLTE

- Xyntéo is an international strategic advisory firm that equips business leaders with knowledge, networks and tools to transform their organisations to compete in the low-carbon economy. We work strategically and practically with some of the world's leading companies from across a range of industries, among them oil and gas, utilities, consumer goods, financial services, shipping and IT. Together we strive to create a new kind of growth, increasingly decoupled from emissions of carbon dioxide.
- The Global Leadership & Technology Exchange, founded by Xyntéo, is a one-of-a-kind partnership uniting world-class businesses engaged in the pursuit of low-carbon growth. GLTE helps senior executives (1) build their knowledge of the low-carbon economy, (2) connect with low-carbon pioneers from other companies and sectors and (3) pursue collaborative projects to improve business performance while removing carbon from value chains.
- The GLTE partnership currently includes Det Norske Veritas (DNV), Deutsche Bank, the Electric Power Research Institute (EPRI), Gazprom, Hess Corporation, PG&E Corporation, Shell, Siemens, Statoil, Subsea 7, Tata Consultancy Services, Tata Sons, Unilever and Wilh. Wilhelmsen

Biofuel targets around the globe

- EU – commitment to 10% reduction in emissions by transportation by 2020 - **Yes**
- UK RTFO – 5% by 2013/14; 10% by 2020 – **Yes**
- US – RFS stipulate 25.7bn litres biofuel in 2010, 227bn by 2020 – **30% by 2030**
- China- biofuel to meet 15% of transport energy by 2020 - **Yes**
- India – considering a 10% biofuel target by 2010 – **No, 20% of diesel & gasoline by 2017**
- Brazil – all petroleum to contain 24-27% ethanol – 2.5bn litres of biodiesel by 2013
- Australia – 2010 – 1% biofuel; 2020 – 5.75% biofuel – **Different states have different mandates – currently circa 5% for 2010/11.**
- 47 countries have declared targets

- The above represents over 51% of world population, 70% of all cars

UK biofuels: market overview

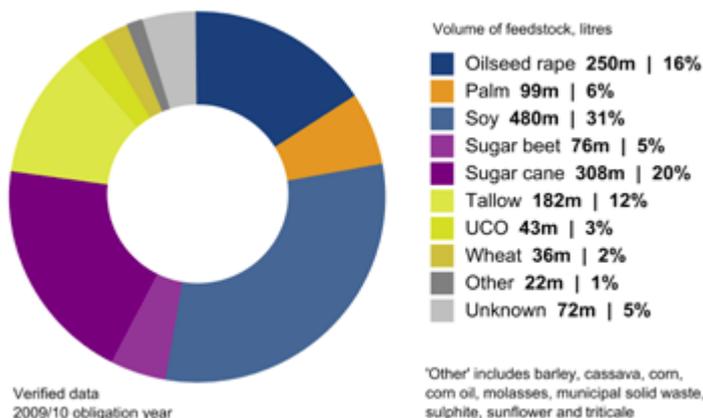
- **UK market**
 - 1,568 million litres (3.33% of total supply) in 2009/10
 - 71% biodiesel; 29% bioethanol; biogas - negligible
- **Biofuel sources**
 - 10% sourced from UK production
 - Balance - imports from Argentina (20%), Brazil (20%), USA (7%), Germany (7%); Malaysia (5%)
- **Existing commitments**
 - EU Renewable Energy Directive - 10% of transport fuel by 2020 (under pressure)
 - UK RTFO target – 5% by 2013/14 (originally 5% by 2010/11- revised in 2009 after Gallagher Review)
- **Achievement 2009/10**
 - 3.33% against revised target of 3.25%
- **Outlook – strong growth**
 - IEA WEO 2010 – global consumption grows from 1.1 mb/d today to 4.4 mb/d in 2035
- **Issues**
 - Missing emissions targets
 - Unintended consequences – food prices, deforestation, increased GHG emissions
 - Lack of policy support
 - <1/3 UK biofuels meet UK government environmental standards
 - Majority of UK suppliers miss GHG savings target of 50% (excludes impact of changes in land use)

EU and UK Government policy

- **Agricultural subsidies**
 - EU Energy Aid Payments Scheme (€45/hectare) - closed December 2009
 - Energy Crops Scheme (England) – available for miscanthus (ligno-cellulosic ethanol feedstock); grant for 50% of all eligible costs incurred
- **Direct support mechanisms**
 - Fuel duty incentive (20p/litre) abolished in April 2010 but available for UCO until 2012
 - RTFO – Renewable Transport Fuel Certificates (RTFCs) – value set by market but buy-out-price “floor” (30p/litre)
- **Capital expenditure**
 - Capital support for building biofuel-processing plants from RDAs (closes March 2012)
- **Government supported R&D**
 - BBSRC Sustainable Bioenergy Centre (£24m) – 6 research programmes (focus on lignocellulosic biofuels e.g. new (marine borer) enzymes for non food biomass conversion)
 - Research Councils' UK Energy Programme - £14.4m bioenergy funding of 76 projects spanning technical, economic, environmental and social issues

Feedstocks current

UK biofuel feedstocks



International feedstocks

Proportion of: biofuel volume | gross land area | net land area

Oilseed rape France	4%	2%	4%	Soy USA	9%	18%	13%
Oilseed rape Germany	10%	6%	9%	Corn France	1%	<0.5%	1%
Oilseed rape Ukraine	1%	1%	2%	Sugar beet France	1%	<0.5%	<0.5%
Oilseed rape UK	3%	2%	3%	Sugar beet UK	5%	1%	1%
Oilseed rape USA	1%	1%	2%	Sugar cane Brazil	24%	4%	14%
Palm Indonesia	2%	1%	2%	Wheat Belgium	<0.5%	<0.5%	<0.5%
Palm Malaysia	5%	2%	4%	Wheat France	2%	1%	1%
Soy Argentina	29%	59%	40%	Other	2%	2%	2%

Feedstocks future

- **Advanced (2nd /3rd generation) biofuels**
 - Lignocellulosic
 - Waste biomass – crop residues
 - Industry waste – e.g. wood chips, fruit pulp
 - Energy biomass crops e.g. miscanthus, jatropha, switchgrass
 - Algal
 - Not all UK appropriate
- **Mainly in R&D / pilot stage**
 - Not commercial before 2020?
- **Geographies**
 - More locally sourced?



UK investment environment

- **RTFO 2nd annual report (2009/10) - UK is a particularly challenging market in which to secure investment**
 - Lower ethanol trade tariffs than rest of EU
 - 'Voluntary' nature of the RTFO's
 - Carbon and sustainability reporting requirements
 - Policy uncertainty
- **Recent news**
 - UK-based investment in 'green' energy projects slumped to around £2 billion in 2010, compared to £7 billion in 2009 – almost every other G20 country recorded spending rises (Pew Report)
 - Carbon Trust's budget cut by 40% eliminating the grant for Newcastle University's algae-for-biofuels research program
 - Renewable Fuels Agency dissolved on March 31st
 - Green Investment bank unlikely to be online until September 2012
 - Feed in Tariff – announcement of consultation and review of FIT for solar power has driven investors away
- **Coalition Government Policy**
 - Government currently undertaking review of RTFO and biofuels more widely
 - Policy direction: Use of biofuels must be sustainable – requirement for robust LCA; address specific concerns re indirect land change use
 - Consultation launched on implementation of EU Renewable Energy & Fuel Quality Directives
 - Legislation due by end of 2011

Has the industry now come of age?

- Once oil is over \$70 a barrel, conventional and new generation biofuels become cost competitive
- **What is required of government(s)?**
 - Joined-up policy – ensure biofuels seen in context of overall carbon / sustainability goals
 - Stable policy
 - R&D support for advanced biofuels
 - Soft loans to bridge “technology valley of death”
 - International certification scheme to ensure that production of biofuels meets certain carbon, sustainable, human rights etc. conditions and takes into account full LCA
 - Appropriate trade tariffs

But plenty of issues to consider.....

- **Potential to reduce GHGs**
 - Some biofuels may lead to greater overall emissions (palm oil)
- **Efficiency of biofuels versus electric vehicle**
 - Biomass to power to EVs - potential for greater energy efficiency
- **Rural development**
 - Impact of biofuel crops on sustainable rural development in the UK
- **Security of supply**
 - Biofuels = diversification, but require fossil fuels for production
- **Competition with food crops**
 - Competing demands for land
- **Area of land**
 - Large areas of land - UK would require 1-1.5m hectares to reach 5% target (20-30% of total arable land)
- **Land use change**
 - Conversion of natural / semi natural habitats to farmland can increase GHG emissions
- **Biodiversity**
 - Land use change and agricultural practices may have negative impact