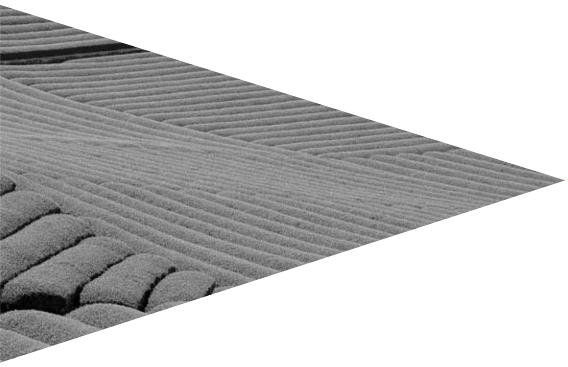
Quarter 1-2 2008

Biofuels country attractiveness indices



In this issue:

Global highlights

Brazil overtakes the US as it continues to lead the drive towards the globalization of biofuels markets by reinforcing its export capacity and opening up to foreign investment from India. Replacing the US as the top country for investment in biofuels, according to Ernst & Young.

Tightening of credit markets causes deterioration in the US and European biofuels markets as the relentless rise in feedstock prices prevails across the globe.

There are signs of some developing Asian industries, such as Indonesia and India, beginning to stagnate in the absence of sufficient forward momentum from government incentives.

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Overview of indices

Ernst & Young's dedicated biofuels country attractiveness indices rank the attractiveness of global markets for investment in biologically derived renewable fuels incorporating both ethanol, a petrol substitute and biodiesel, a substitute for diesel fuel.

The indices provide scores out of 100 and are updated on a regular basis. The indices take a generic view and different sponsor/financier requirements will clearly affect how countries are rated. Ernst & Young's Renewable Energy Group can provide tailor-made studies to meet specific corporate objectives. It is important that readers refer to the guidance notes set out on this page when referring to the indices.

Biofuels index

The individual ethanol and biodiesel indices combine in equally weighted proportions to generate the all biofuels index, which is made up as follows:

- Biofuels infrastructure index – 35%
- Fuel specific indices – 65%

Biofuels infrastructure index

The biofuels infrastructure index is an assessment by country of the general regulatory infrastructure for biofuels. On a weighted basis, the index considers:

- Market regulatory risk – 29%: the score in this category depends on how strongly the general regulatory, political and economic environment in the respective market advocates the production, distribution and use of biofuels.
- Supporting infrastructure – 42%: a market with sufficient arable land available to cultivate, an established and wide-spread distribution network and R&D activity will score well.
- Access to finance – 29%: markets with a sound financial industry, proven financial track record of financing biofuels projects, listed companies operating in the biofuels sector and strong appetite by foreign and domestic investors score highly.

Fuel specific indices

This comprises two indices providing fuel-specific assessments for each country, namely:

- Ethanol
- Biodiesel

Each of the indices considers, on a weighted basis, the following:

1. Offtake incentives – 25%: this includes the level of mandatory blending targets, tax breaks on fuel excise duty and tax credits awarded to biofuels producers.
2. Tax climate – 8%: countries that create a favorable tax climate such as enhanced capital allowances or corporation tax holidays will score highly.
3. Grants and soft loans – 8%: comprises grants and soft loans for investment in biofuels production.
4. Project size – 8%: scale and volume of new projects being announced.
5. Current installed base – 11%: existing production capacity installed in a country.
6. Domestic market growth potential – 15%: gasoline/petrol or diesel consumption of a country is used to determine the ultimate growth potential for alternative fuels.
7. Export potential – 15%: a market's score is determined by its geographical location and any free trade agreements to which it is a party.
8. Feedstock – 10%: takes into account the energy yield, sustainability and price volatility of a country's main biofuels feedstocks.

Comments and suggestions

We welcome your comments or suggestions on any aspect of the indices. Detailed attractiveness surveys and market reports can be provided taking account of specific corporate objectives. Please contact Jonathan Johns or or Rob Hearn:

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Ernst & Young was ranked the leading project finance advisor in the Americas, Europe, Middle East and Africa between 2001 and 2007 by Project Finance International.

Focus firmly on the next generation

The transition to second-generation technologies needs to be accelerated as political and economic pressures on first-generation technologies mount and the biofuels industry seeks to establish its long-term viability.

At the present time, it remains difficult to implement a consistent and robust carbon and sustainability framework on an international scale. Public sentiment of confidence in first generation biofuels is being affected as the food vs. fuel debate intensifies. There is the prospect that economic pressure from rising feedstock prices is undermining the viability of some first generation biofuels as a long-term solution.

Scientists and producers agree that second-generation biofuels, which involve among other solutions the breakdown of nonedible crops and waste to create liquid motor fuels, will have smaller carbon footprints and be more sustainable than current technologies. They do not compete directly with food and achieve greater efficiencies.

However, second-generation biofuels are not yet in a position to be commercially viable on a large scale. The significant advances in R&D over the last few years need to be commercialized in order to make processes more cost- and energy-efficient.

Motivated by a wider drive for energy self-sufficiency, the **US** has made the biggest inroads into developing second-generation biofuels with the announcement of significant levels of subsidies. In addition, a tradition of the venture capitalist (VC) funding is turning California's Silicon Valley into a cleantech R&D hub. However, other countries with a less well-established R&D culture have seen that their attempts at relying on the private sector for technological development are advancing at a slower pace.

Given the challenges still to be overcome on second-generation technology development, first-generation technologies will continue to have an important medium-term role to play in meeting existing targets, but there is likely to be a shift in focus of production to a few key markets where first-generation biofuels can be produced most economically and sustainably (e.g., **Brazil**).

From an investor perspective, there is a long-term strategic rationale for investing in the second-generation industry, in upfront R&D and the subsequent commercialization and scale-up of a second-generation based industry. This will include substantial capital investment in new support infrastructure for harvesting, transporting, storing and refining. At the same time, improved government incentives are required to attract the necessary capital into the market, to stimulate growth and accelerate the evolution of the industry.

Although the second-generation industry is ready to accept and respond to these challenges, investment from private and public sources is needed to achieve commercialization, together with strong and consistent support from international governments – to bolster investor confidence for the long term and provide a robust framework which would resolve carbon and sustainability issues and incentivize and monetize the value of good-quality biofuels.

In the interim, in many countries, first-generation biofuels face significant challenges. The credit crunch is also having a significant impact, and we will be commenting on this in the next issue of the indices.

Jonathan Johns
Ernst & Young Renewable Energy Group, Exeter, UK

Market activity, Q1-Q2 2008

North America

The Canadian Senate passed Bill C-33 requiring an E-5 mandate by 2010 and B-2 mandate by 2012. This would mean more than double the current ethanol fuel production and the same for biodiesel.

This quarter, deal activity continues to be driven by investment into second-generation technologies and consolidation in the supply chains.

PetroSun Biofuels, a US-based algal biodiesel developer has agreed to acquire a 50% interest in **Fleet Biodiesel**.

Cellulosic ethanol producer **Range Fuels** has raised US$100m in venture funding which will be used to build a commercial scale ethanol plant.

Chevron and **Weyerhaeuser** have formed a biofuels JV which will focus on developing next-generation renewable transportation fuels from nonfood sources.

Ethanol project developer **Green Plains Renewable Energy** has completed its previously announced acquisition of grain storage company **Great Lakes Cooperative**.

Tight credit markets and high feedstock costs have caused several companies to delay or halt construction on their plants including **Kreido Biofuels** and **US Ethanol Holdings**.

SoyMor has put biodiesel production on hold at its 130mLpa plant in Minnesota due to high feedstock costs.

Bioethanol plant developer **Ethanex Energy** has terminated its US$220m acquisition agreement with **Midwest Renewable Energy** and filed for bankruptcy.

Projects are predominantly being financed privately as public offerings currently face adverse market conditions with a lack of investment appetite.

US biodiesel producer **Imperium Renewables** cancelled its already delayed US$345m IPO which would have made it the largest pure play biodiesel company to trade on a major US exchange.

Biodiesel plant developer **Renewable Energy Group** has aborted its US$150m IPO plans due to market conditions.

WestLB has provided US$41m in debt financing to **Nova Biosource Fuels** and a US$150m senior bank credit facility to **Greenhunter Energy** to fund its biodiesel facility in Texas.

South America

Investment in South American biofuels industries is strong, with the objective of growing the export markets high on the agenda.

Brazilian oil producer **Petrobras** has announced plans to form a pure biofuels subsidiary which will oversee all of the company's biofuel activities. The company has also entered downstream operations for the first time after completing a US$50m purchase of an **ExxonMobil** refinery in Japan. Petrobras plans to invest US$1b in the refinery, which will act as a springboard for expansion into Japan and the rest of Asia.

Petrobras is also forming a JV with Mitsui in Brazil in order to invest in bioenergy projects which will produce ethanol for export to Japan. The company has also completed its 50,000 tonne biodiesel plant in Quixado, Brazil.

India's **Bharat Petroleum**, **Indian Oil** and **Hindustan Oil** are to form a consortium which will invest US$600m in Brazilian ethanol-producing companies.

Brazilian asset management company **DGF Investimentos** has created a private equity fund which aims to raise US$170m over the next four years to invest in the ethanol sector. Another new PE fund, **Brazil Agro Energy Fund** has a mandate to invest over US$2b in Brazilian sugar and ethanol mills.

US firms have negotiated a US$342m deal to construct three ethanol facilities with a combined capacity of one million liters per day in Colombia, doubling total production in the country.

Greenenergy, the UK-based biofuels trader has developed a set of sustainability criteria for imported fuel ethanol from Brazil to meet the requirements of the RTFO.

Europe

In Germany, **Marina Biodiesel** has sold its large biodiesel plant to **Babcock and Brown** and is now in liquidation.

The European Commission has given the OK to the planned **DuPont** and **Danisco A/S** JV. **DuPont Danisco Cellulosic Ethanol** will be based in the US.

Italian chemical group **Mossi & Ghisolfi** plans to build a 253mLpa bioethanol plant which will eventually produce cellulosic ethanol, with total investment of over US$320m.

Spain's **Infinita Renovables** has announced plans to develop two large biodiesel plants with a combined total capacity of over 1bLpa, costing c.US$443m.

Spain's **Abengoa Bioenergy** has decided to keep its 200mLpa ethanol plant closed due to high feedstock prices and uncertainty over demand for fuel.

British **D1 Oils** has been forced to cut jobs in the UK as it is struggling to compete with subsidized US imports. The company has secured a cash injection of GB£14.9m that will help to alleviate pressure on the struggling business.

HM Customs has shown that biodiesel consumption has increased 83% year on year. Consumption in June 2008 was 82.796 tonnes compared with to 26.66 tones in June 2007.

Rest of world

The US$5.9b biodiesel project owned by Indonesia's **Sinarmas** and **China National Offshore Oil Corporation** has been suspended due to the high crude palm oil price.

The Indonesian Government plans to start its mandatory fuel blending program in September 2008.

A unit of **Charoen Pokphand Indonesia** has announced plans for a US$250m project to develop palm oil plantations in Borneo as a result of the high demand for biofuel.

China's **Sinopec** is to invest US$5b in biodiesel feedstock plants and crop development in Indonesia in a move to aggressively increase its biodiesel capacity.

Gushan Environment Energy Ltd has announced its Shanghai plants production which will add 50,000 tonnes to the annual Chinese biodiesel production capacity.

China Agro-Technology is planning to invest US$200m to develop a 2.4bLpa biodiesel project in the Guangxi region over the next four years.

Tianguan Group, a Chinese biofuel project development company, has commissioned the country's first cellulose ethanol plant. The project cost US$6.8m and is expected to produce 38mLpa.

Indian **Tata Chemicals** has announced plans to invest US$185m in its ethanol business over the next three years.

Australian biodiesel company **Jatoil** made its ASX debut but at a 20% discount to the offer price.

Thai **Oleochemicals** has opened a 200,000 tonnes per annum pure biodiesel plant in Thailand and has negotiated contracts with at least 10 crude palm oil suppliers to ensure security of the feedstock supply.

Samsung have made plans to invest up to US$1.63b in land and plant for biodiesel production in Indonesia.

All biofuels index at Q1-Q2 2008

Ranking[1]		Country	All Biofuels	Ethanol	Biodiesel	Infrastructure
1	(2)	Brazil	73	78	68	94
2	(1)	US	72	78	67	80
3	(4)	France	60	60	60	67
4	(5)	Spain	57	59	55	60
4	(5)	Canada	57	64	49	72
6	(3)	Germany	56	59	54	79
7	(7)	Thailand	54	54	54	47
8	(7)	China	53	56	50	47
9	(10)	Colombia	51	54	48	50
9	(10)	Sweden	51	54	47	66
9	(9)	UK	51	53	49	55
12	(10)	India	50	53	47	49
13	(13)	Italy	49	49	49	47
14	(13)	The Netherlands	48	50	n/a	48
14	(-)	Indonesia	48	49	47	45

Source: Ernst & Young
1 Ranking in the Q4 2007 all biofuels index in brackets

Brazil has replaced the US at the top of the all biofuels index following the compulsory B-3 blending which started on 1 July. This has increased annual biodiesel demand to 1.2 billion liters from 800 million. A report by the International Monetary Fund (IMF) in May estimated biofuels were accountable for a 70% increase in maize prices. Local investors are expanding the international reach of Brazilian ethanol through overseas investment in distribution assets. Brazil's export potential strengthens as India is emerging as a new export market and increasing quantities of ethanol are being exported to the US via the Caribbean at low cost. This is being combined with other export news which sees Japanese oil distributors, including Nippon Oil, thought to have entered contracts to buy up to 160,000t/yr of Brazilian ethanol. Brazil was chosen due to its ability to commit to a stable supply opposed to some of Japan's Asian counterparts.

In the **US**, the Energy Independence and Security Act introduced in December 2007, appears to be providing sufficient headroom for the private financing trend to continue. Opportunities are arising in the south-eastern states where there is a need for biofuels transportation infrastructure. However, public market performance of biofuels companies is weakening and investors are becoming more hesitant to invest in the sector. The World Bank published research in July indicating large increases in biofuel production in the US and **Europe** were behind the sharp increase in global food prices. The research mentions Brazil's sugar based ethanol has not affected food prices much due to the overall increase in the country's sugar cane output and sugar exports. Political pressures is being put on presidential candidate Barak Obama, who has consistently promoted the use of biofuels and is in favour of incentive mechanisms towards their use, and he is under pressure to reduce his support as rising food prices continue to be blamed on increasing biofuels usage.

Germany has lost four points as a direct result of the government's decision to withdraw the E10 roadmap. The lack of investment in second-generation biofuels is conspicuous considering the current market perception of biofuels and existing production capacity remains under financial pressure, with some plants facing restructuring/liquidation.

The rise of **France, Spain** and **Canada** in Q1 and Q2 2008 are predominantly due to the fall of Germany.

The **Thai** government's recent approval of US$12.7b in loans has incentivized rural farmers to start growing energy crops. This will stimulate domestic biofuels production increasing Thailand's score by a point.

The **UK** has lost a point as investor confidence is being harmed by considerable criticism over first-generation biofuels by several British NGOs and the government's chief environmental scientists. The release of the Gallagher Report has also led to the slight decline in the UK's position. Efforts continue to enforce a robust act of carbon and sustainability standards which should provide a concrete foundation for future growth.

India's efforts to stimulate the industry are being hampered by a lack of harmonization of tax incentives between states and state and federal legislation progressing at a slower pace than necessary. A biofuels policy was expected to be announced in March but did not materialize, sparking doubts over the government's support for the industry.

Indonesia has re-entered the all biofuels index this quarter on the strength of its growing ethanol industry. Growth is being stimulated by government initiatives to increase cultivation of natural resources to produce biofuels, as well as support and integration of plantations with ethanol manufacturers.

Ethanol index at Q1-Q2 2008

Ranking[1]		Country	Ethanol index
1	(2)	Brazil	78
1	(1)	US	78
3	(4)	Canada	64
4	(6)	France	60
5	(5)	Spain	59
5	(2)	Germany	59
7	(7)	China	56
8	(10)	Colombia	54
8	(7)	Sweden	54
8	(11)	Thailand	54
11	(11)	India	53
11	(9)	UK	53
13	(11)	The Netherlands	50
14	(14)	Italy	49
14	(-)	Indonesia	49

Source: Ernst & Young
1 Ranking in the Q4 2007 ethanol index in brackets

The **US** loses a point and is joined by **Brazil** at the top of the ethanol index. The southeast of the country has until recently had a minimal market penetration of ethanol, however higher demand is starting to stimulate investment in infrastructure and production capacity. At the same time, high feedstock prices continue to put pressure on the economic viability of projects, with delays and asset disposals emerging.

Brazil gains three points to lead the table as public and private investment is increasing in the sector in both domestic and foreign operations. The Brazilian government announced plans to invest US$5b over the next four years in an attempt to make Brazil the world's largest ethanol producer. Brazil's total ethanol consumption of nine billion liters in 2007 exceeds the increase in total fuel consumption of seven billion liters and successful growth of the export market is continuing as evidenced by investment from Indian companies.

The **German** government's decision to withdraw the much anticipated E10 roadmap is expected to limit expansion potential within the ethanol industry and affect existing players adversely. In light of this, Germany's score has fallen by six points to the benefit of Canada.

In **France**, domestic ethanol consumption is predicted to reach 900m liters in 2008, up 60% on consumption in 2007. The French government also issued 50% more tax-reduced production quotas for 2008, strengthening its position in the index.

Continuing high feedstock prices and uncertainty over domestic demand for ethanol have caused **Spain** to lose a point.

Sweden has lost two points as a lower tariff for ethanol imports from Brazil continues to undermine interest in domestic investment and high grain prices are resulting in the mothballing of existing ethanol plants.

Since **Thailand** introduced the US20¢ per liter gap in price between gasoline and E20 in January 2008, the consumption of E20 has increased by 357%, consequently Thailand moves up in the ranking.

Rather than promoting growth in the domestic industry, the significant injection of investment by Indian firms in Brazil has caused **India** to lose a point.

As with biodiesel, the **UK** ethanol industry continues to suffer from insecurity within the market following the release of the Gallagher Report which calls for lower targets. In the long term the strict carbon and sustainability criteria set out in the RTFO could well be of benefit to the industry once it has migrated to the new standard.

The **Philippines** has dropped out of the ethanol index this quarter as plans to import ethanol from Brazil and Thailand will drive down domestic investment. It is replaced by **Indonesia**, where investment in the industry is strong and the Chamber of Commerce has launched a unit to bolster the production of cassava crops in response to a growing demand for ethanol.

Biodiesel index at Q1-Q2 2008

Ranking[1]		Country	Biodiesel index
1	(2)	Brazil	68
2	(1)	US	67
3	(2)	France	60
4	(5)	Spain	55
5	(4)	Germany	54
5	(6)	Thailand	54
7	(7)	China	50
7	(9)	Canada	50
8	(14)	Italy	49
8	(7)	UK	49
11	(10)	Colombia	48
11	(11)	Philippines	48
13	(11)	India	47
13	(11)	Indonesia	47
13	(14)	Sweden	47

Source: Ernst & Young
1 Ranking in the Q4 2007 biodiesel index in brackets

Brazil gained a point and moves to first place due to the success of the introduction of B2 and the subsequent decision by the government to bring forward the deadline for obligatory 5% biodiesel blending to 2010 from 2013. The biodiesel industry seems to be weathering the current price pressure on biodiesel and the mandate could lift Brazil to the world's second-largest biodiesel producer.

High feedstock costs are causing uncertainty in the market and a large number of companies are calling a halt to their biodiesel plant construction and development plans, which has meant that the **US** has lost a point in the biodiesel index this quarter.

Although larger firms are benefitting from consolidation in the industry and minimum blend requirements, many **German** biodiesel producers have been reporting year-end losses and several have been forced to wind up their companies or face bankruptcy, causing Germany to lose two points.

Thailand has gained a point following plans by its Agricultural Land Reform Office to increase the area under oil palm cultivation by 400,000ha and to provide soft loans to palm oil producers in several provinces.

Canada has increased a point and therefore moved to seventh place following the introduction of mandatory blending targets.

The **EU** has approved a government plan of a US$595m tax break for 250,000mtpa of **Italian** biodiesel from 2007 to 2010. The excise duty for biodiesel will be only 20% of that faced by regular diesel oil. This is expected to stimulate production and consumption of biodiesel in Italy and consequently Italy's score has increased by two points.

The **Indonesian** biodiesel industry has been struggling this quarter. Production has fallen by 85% as a result of a drop in demand from state oil company Pertamina following the reduction in its biodiesel content from 5% to 2.5%. Producers are blaming the government for a lack of support for the industry and inconsistent policymaking. Consequently Indonesia has lost a point.

Glossary

AIM	Alternative Investment Market
ASX	Australian Stock Exchange
B2	Fuel mix containing 2% biodiesel
B99	Fuel mix containing 99% biodiesel
bLpa	Billion liters per annum
b	Billion
BNDES	Banco Nacional de Desenvolvimento Econômico e Social
CHP	Combined heat and power
E10	Fuel mix containing 10% ethanol
E20	Fuel mix containing 20% ethanol
E85	Fuel mix containing 85% ethanol
EISA	Energy Independence and Security Act
EU	European Union
ha	Hectare
IPO	Initial public offering
JI/CDM	Joint implementation/clean development mechanism
JV	Joint venture
kg	Kilograms
ktpa	Kilo tonnes per annum
m	Million
mtpa	Million tonnes per annum
mLpa	Million liters per annum
NGO	Non-governmental organization
PE	Private equity
PPA	Power purchase agreement
R&D	Research and development
RTFO	Renewable Transport Fuel Obligation

Notes

Notes

Ernst & Young Renewable Energy Group

With a dedicated 60-strong team of international advisors operating from our UK member firm, supported by a network of over 65 experienced professionals from our member firms worldwide, Ernst & Young's Renewable Energy Group helps clients to increase value from renewable energy activity. Members of the Group provide advice and services in the following areas:

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