

Structural Shift in EU Energy Portfolio ahead

Bio fuel growth expected at the expense of mineral oil refinery capacities

Today, bio fuels are hyped in industry and politics. Because of their sustainability their use is seen as an environmentally sound solution to energy and emission problems especially in Europe. Therefore, the share of bio fuels in the European energy portfolio is increasing. Oil majors, traditionally offering mineral oils, as a consequence are expected to experience an increasing road fuel surplus putting current mineral oil refining capacity utilization at risk. German firms are observed to be leaders in making use of renewable energy and will profit most from the obvious shift in offering structure.



Growth opportunities in bio fuels exceed 20 percent

As EU targets for the percentage of bio fuels are ambitious (5.75 percent of all road fuels by 2010) these targets may not be met. But on the other hand A.T. Kearney experts are positive that the EU's 2020 targets for bio fuels (20 percent representing a total market size of up to 12 million tons a year) can be even exceeded (given a continuation of governmental and EU subsidies).

These expectations mean significant growth opportunities in bio fuels for both, mineral oil players and agro companies in almost all EU countries.

Germany for instance, already represents approximately one third of the EU bio fuel market. EU wide, some companies have taken on a pioneering role and are likely to influence product standards (e.g. EN 14214).

Quality acceptance of i.e. palm-oil derived bio fuels seems to be just a question of time, blending restrictions and quality issues raised by mineral oil players are about to be solved.

Pioneers in bio diesel are likely to soon dominate the EU bio fuels market

Second generation bio fuels will take the lead against bio diesel etc.

After bio diesel and ethanol are still the only commercialized bio fuel products and both are based on edible substances like rape seed or sugar there is a demand for second generation bio fuel which do not contain edibles.

“Biomass-to-liquid” (BTL) is the alternative with major advantages like a

very efficient energy balance and applicability in fuelling cars. These fuels are based on gasification of biomass and are produced in a complex thermo-chemical process. A.T. Kearney expects BTL having best chances of becoming the preferred future (bio) fuel depending on how fast technology catches up.

Pilot plants like Choren (a R&D focused cooperation of Shell, DaimlerChrysler and Volkswagen with a capacity of 15.000 tons per year) are already working towards a fast solution aiming at the establishment of BTL/synthetic fuel as default bio fuel.

The new EU supply chain for bio fuels will focus on North-West Europe

Given the expectation that the EU’s position in favor of the application of bio fuels increases, current mineral oil based supply chains need to change. As the EU is not self sufficient in generating the crops needed for bio fuel production increasing crop imports are predicted.

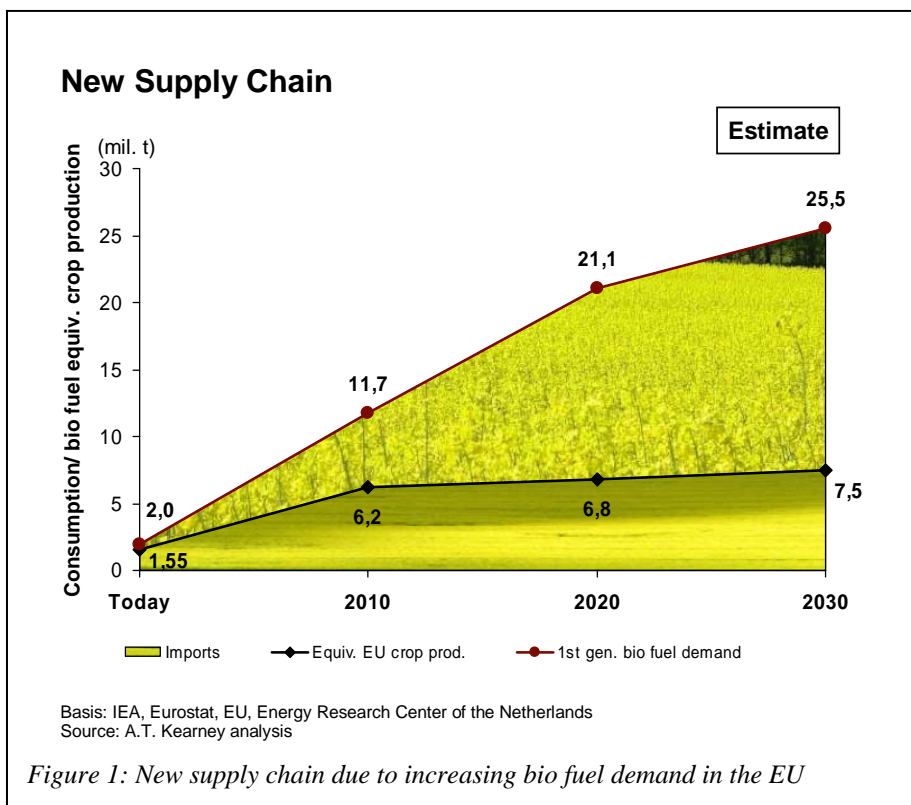
Therefore, Malaysia, Indonesia and also the Ukraine are expected to become major suppliers of relevant crops or oils to the EU. Given current cost advantages of crop supplies from abroad it is also expected that volume imports further increase. Even though the EU would be interested in using as much owns crops

as possible, increasing imports ask for new logistics facilities in the EU, in the countries of origin and also along the supply routes down to the refiner.

Following this, production facilities have to be established at locations that are logistically suitable. As the dependence on crops asks for a particularly flexible supply chain, investments have to be made in line with these demands.

In the mid term, especially the North Sea ports in Rotterdam or Wilhelmshaven as well as the French port of Marseille in the Western Mediterranean will remain important discharging terminals and could profit from this development. As these ports have enormous capacities (together nearly 250 million tons a year) it can be expected that e.g. Germany will satisfy its increasing crop demand in the future by more and more imports.

Until 2020 experts see a gap between first generation bio fuel demand and production of about 15 million tons per year develop that has to be bridged by imports.



Different technologies will be applied in the new bio fuel refining market

This new market will also mean new technologies have to be developed and applied and bio fuel refining capacities have to be built. Major investors in bio diesel are Diestel, Loders Crooklaan, Kuok Oils and Grains or Cargill. These agro companies are positioning themselves as pioneers.

Future investors might also be agro companies or crop importers. The agro companies are likely to diversify their offering portfolio to set the basis for future growth, e.g. with palm oil derived bio diesel.

Also traditional oil majors will become more active in the bio fuel market but focusing on technology-driven and complex second generation BTL technology, trying to become first movers in this market.

Leveraging these new technologies enables them to gain a competitive advantage against first generation bio fuels and thereby aiming to secure their traditional mineral oil based core business (in particular downstream oil refining).

In Germany about five mineral oil refineries may vanish from the market in the mid term

Traditional mineral oil refineries will suffer market shrinkage

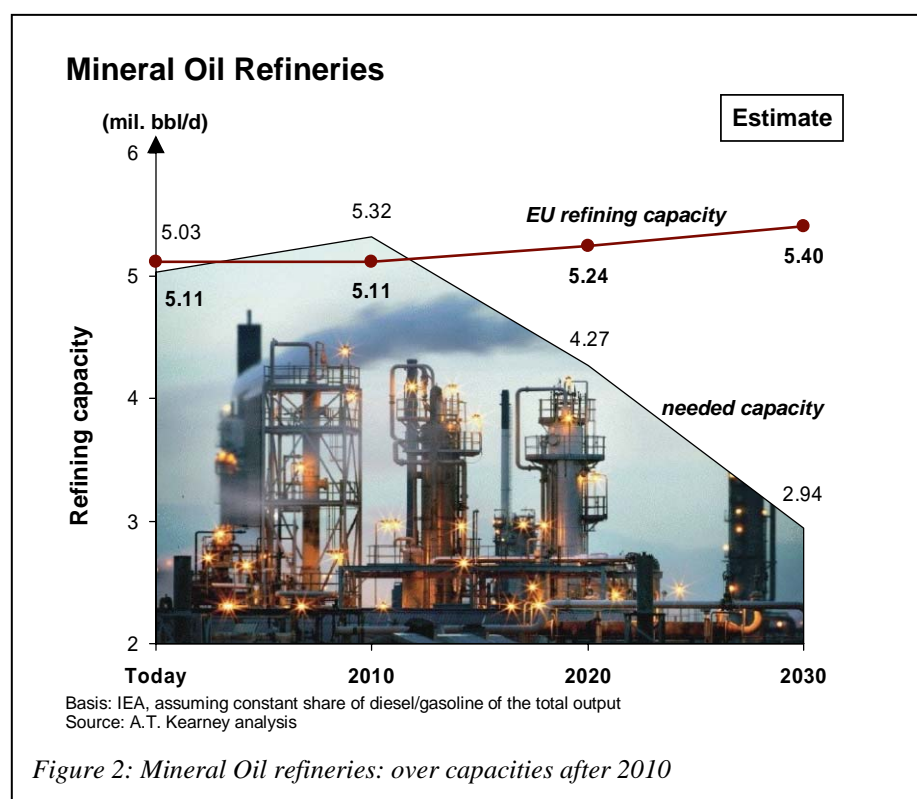
Production capacities for traditional mineral oil refiners are expected to become obsolete to an extent of about one million bbl/d which represents about one fifth of the European refining capacity until 2020. This is resulting from the expected long-fall in automotive diesel which – in sharp contrast with today's diesel shortage situation – will occur in the long run.

As balancing of automotive diesel production versus the mineral oil production mix is seen as limited and would further increase the negative impact on motor gasoline/heating oil, adjustments in the supply & demand situation up to the point of refinery dismantling have to be considered.

This will lead to consolidation of the refinery landscape, where small sized plants with limited leverage of economies of scale will be the first to be under discussion. Moreover, the value added produced will be decisive in the consolidation process. The less value added is produced (e.g. downstream

petrochemical integration), the less chance for survival of the producer in the future. In Germany this can lead to closing down up to five traditional

refineries with a focus on minerals oils. Even larger capacities are at risk e.g. in the Netherlands that today head up the refineries market in the EU.



Conclusion

As the share of renewables in the EU energy portfolio is increasing to meet environmentalists demands, the oil majors will have to realign their core competences and their portfolio in accordance. Otherwise they will suffer

from expected increasing road fuel surpluses and as a consequence from a decrease in margin already expected. Countries with less traditional refinery capacities are likely to profit from the shift to renewable energies. Players that

manage the changes actively, will experience enormous growth in the decades to come.

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