

National Report on biodiesel use in Greece

EIE- 05- 113

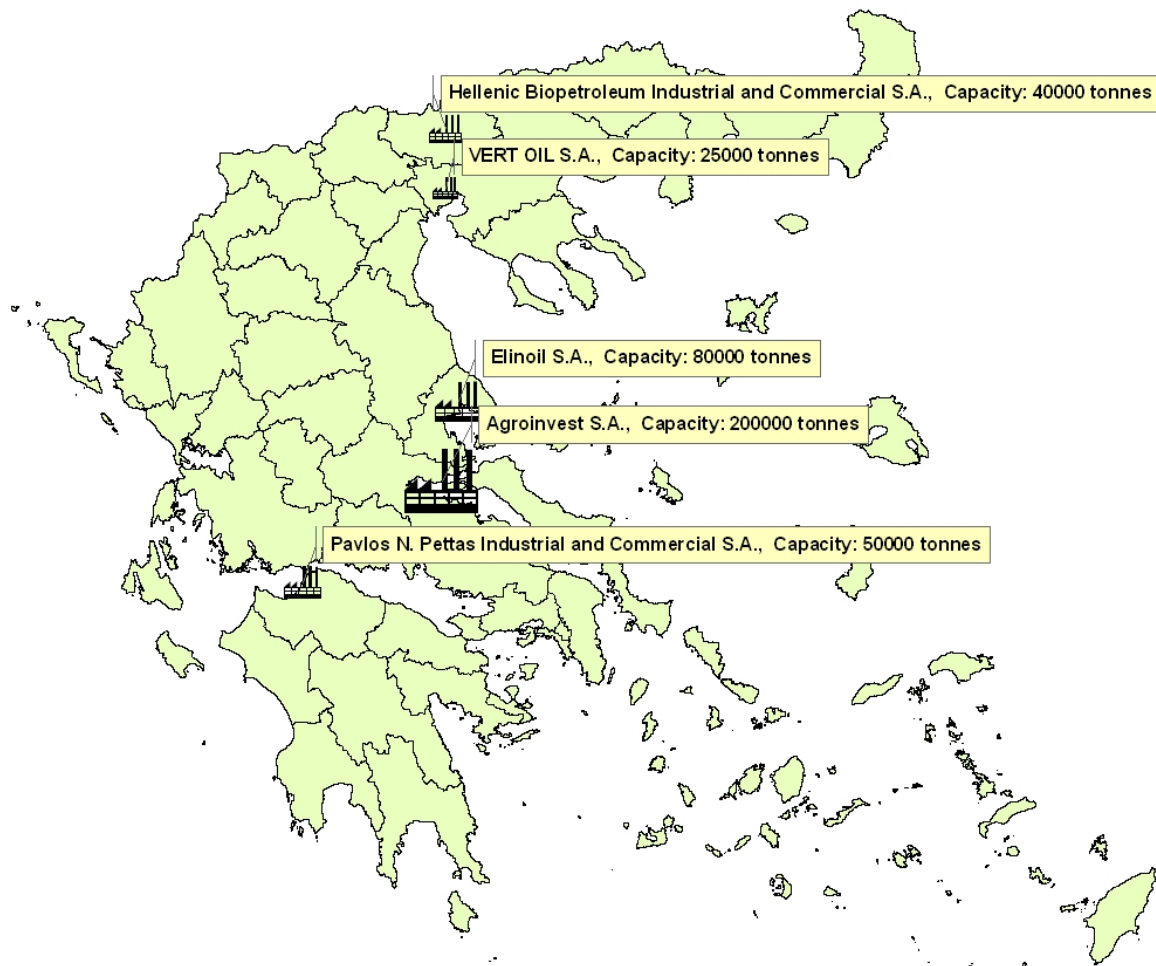
BIODIESEL CHAINS

1. Introduction

Of the potential biofuels listed in Directive 2003/30/EC, the most promising for Greece are biodiesel and bioethanol, and there is also some interest in pure vegetable oil.

In 2004, fuel consumption for transport purposes in Greece totalled 2 036 000 tonnes of diesel and 3 814 000 tonnes of petrol (unleaded and LRP); no biofuels were marketed or consumed in Greece in this period.

The first domestic biodiesel production plant, operated by Hellenic Biopetroleum Industrial and Commercial S.A. at Kilkis, with an annual production capacity of 40,000 tonnes, started operating in December 2005. A second biodiesel production plant, operated by VERT OIL S.A. in Thessaloniki, with an annual production capacity of 25,000 tonnes entered production on July 2006; a third plant, operated by Pavlos N. Pettas Industrial and Commercial S.A., with an annual production capacity of 50,000 tonnes, and same start production date. A fourth plant, with an annual production capacity of 200,000 tonnes, by Agroinvest S.A. at Fthiotida, central Greece started production on November 2006 and a fifth one with an annual production capacity of 80 000 tonnes, by Elinoil S.A. at Volos started operation on December 2006.



Map 1. Initial installation of biodiesel plants in Greece

According to currently available data, a further eight biodiesel production units are at the initial stages of design and construction: four with a capacity of 5,000 tonnes, two with a capacity of 11,000 tonnes, one with a capacity of 22,000 tonnes and one with a capacity of 100,000 tonnes, with estimated production start dates in the end of 2007.

The raw materials used by the above biodiesel production units comprise about 70- 80% imported oils (rapeseed, soya-bean, etc.) and about 30% domestically produced oils (cotton-seed, sunflower, used cooking oil, etc.). Attempts to intensify domestic sunflower and oilseed rape crops are on the increase, with a view to domestically produced raw materials exceeding imports.

Biodiesel may also be imported, both from other EU Member States or accession countries (Bulgaria, Romania, Turkey) and from non-member States, provided the price of the biodiesel is not increased excessively by the transport costs.

Automotive biodiesel distributed in Greece has to comply with the specifications of the ELOT EN 14214 standard.

Initially, biodiesel is intended only for blending with automotive diesel in a proportion not exceeding 5% by volume. Distribution of pure biodiesel on the retail market will follow, as will the blending of a higher proportion of biodiesel in automotive diesel intended for vehicle fleets (e.g. public transport vehicles).

The distribution of biodiesel in Greece started in December 2005 when the first batches were distributed to refineries by Hellenic Biopetroleum S.A. The blend of 2% biodiesel by volume in automotive diesel has been distributed to all final consumers since February 2006 and continues to be distributed smoothly. This percentage was raised to 3.5 % by volume by about the end of 2006, and is expected to reach 5% in 2007.

2. Legislative framework

2.1 Transposition of Directive 2003/30 and national indicative targets

Directive 2003/30 has been transposed through the Greek Act 3423/2005 on the introduction of biofuels and other renewable fuels on the Greek market. This legislation sets down a national indicative target of 5,75% for 2010.

The current law imposes the obligatory use of all detaxed biodiesel in the existing refineries (in an up to 5% blend). The detaxed quantities are decided on an annual basis under a quota scheme. Law 3340/05 (Article 34) states that the detaxed biodiesel quantities are 91,000 m³ (71,851 tonnes) for 2006 and 114,000 m³ (97,695 tonnes) for 2007, while no detaxed quantities have been announced so far for bioethanol. The detaxed biodiesel quantities are presented in the Table .

Table 1 Estimated biodiesel requirements. In 2005 only 420 tonnes biodiesel were produced while in 2006, 51,545 tonnes were produced and delivered to the refineries for blending.

Year	Estimated automotive diesel consumption (thousands of tonnes)	Biodiesel used (%)	Biodiesel required (tonnes)
2005	2,084	2,00	46,976
2006	2,125	3,00	71,851
2007	2,167	4,00	97,695
2008	2,208	4,50	111,986
2009	2,249	5,00	126,739
2010	2,290	5,75	148,407

Source: YPAN 2004

2.2 Taxation

In Greece, the normal excise duty for diesel is of 276€. Biodiesel produced within the quotas is totally exempted from the excise. No direct subsidy is applicable for biodiesel so far in Greece.

Mandates

According to the Greek authorities, legislative measures applying to biofuels should be revised as from 2008 and should establish mandatory targets, both for biodiesel and for bioethanol.

Quotas

A provision incorporated in Article 34 of Act 3340/2005 provides for a full exemption from excise duties for the following quantities of pure biodiesel:

- for 2005: 51 000 m³ (in 2005)
- for 2006: 91 000 m³ (published by the end of 2005)
- for 2007: 114 000 m³ (published in December 2006)

The full exemption represents about 33 million € for the year 2007.

3 Land use patterns

The total agricultural area of Greece is 3.8 million ha (NSSG, 2004) mainly consisting of arable (56%) and tree (30%) crops (Figure 1).

During the ten years from 1995 to 2004 no major changes in the land use patterns occurred for the main crops which can be used as raw materials for biodiesel. In detail cotton cultivation presents slightly downward trend from 420,000 ha in 1995 to 370,000 ha in 2004. Sunflower is mainly produced in northern Greece and presented an increase from 1995- 1999 (20,000 – 30,000 ha) but declined afterwards reaching to 4,700 ha in 2004.

Soya cultivation is really marginal within the country with 40 ha factor which despite its good potential for biodiesel make it a less important indigenous crop at least for the short term.

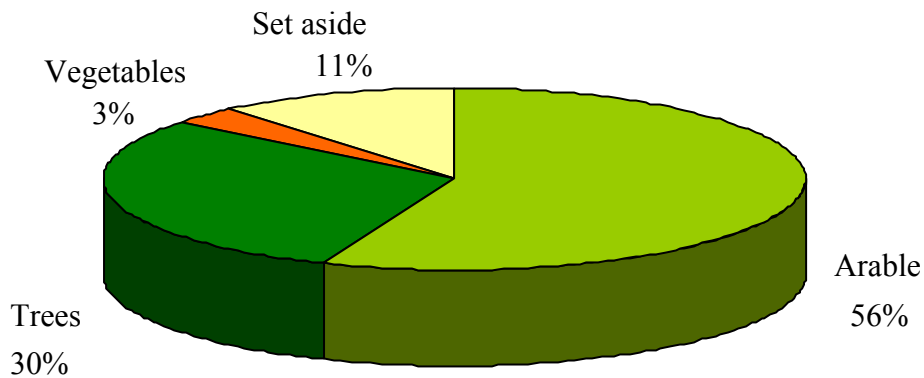


Figure 1: Land use in Greece (Source: NSSG – Agricultural Statistics, 2004)

Figure 2 shows the annual cultivated area for the indigenous crops during the period 1995- 2004.

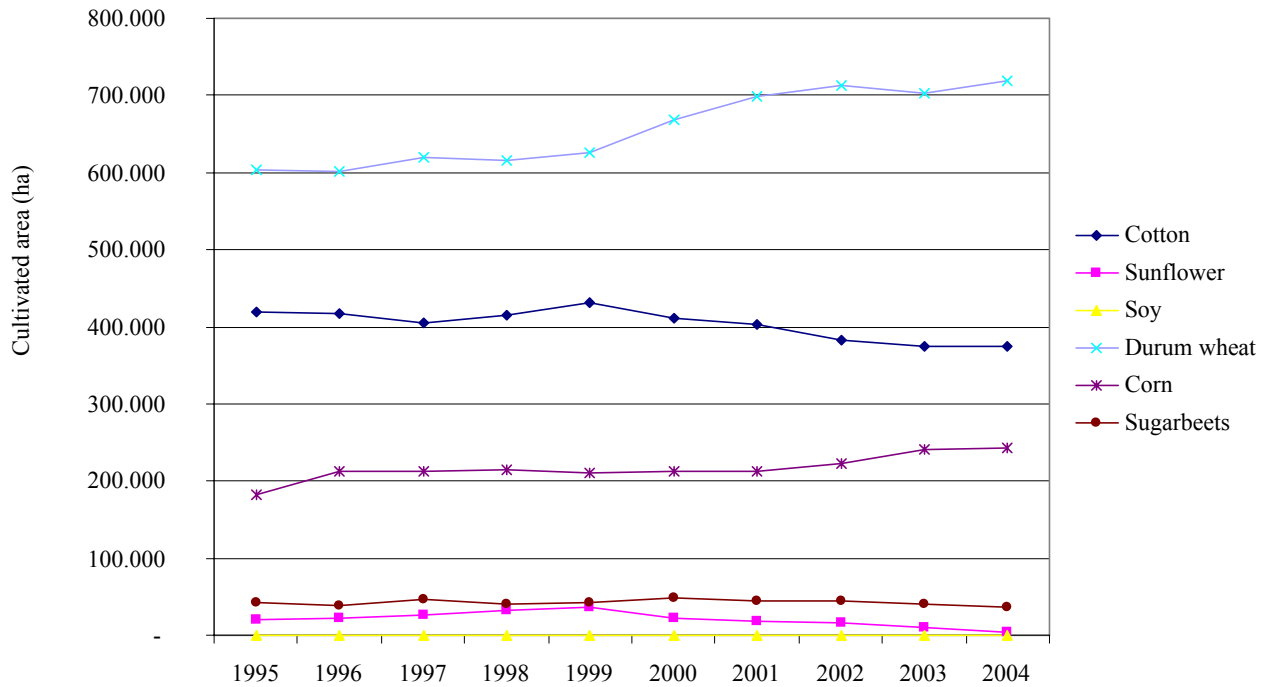


Figure 2: Cultivated area for indigenous oil crops during 1995-2004 (NSSG, 2004– Agricultural Statistics)

4. Feedstock supply

4.1 Vegetable oils

Domestic industrial production

According to NSSG the main vegetable oils produced in the country consist of soy oil, sunflower oil and cottonseed oil with the respective seeds being either domestically produced or imported (highly in the case of soy).

The above are considered as potential feedstocks for biodiesel production. Domestic industrial oil production during the period 1995- 2005 and the respective average prices are presented in Figure 3 below.

Both soy oil and cottonseed oil have average prices around 600 €/t, while sunflower oil price is much higher reaching up to 890 €/t in 2004.

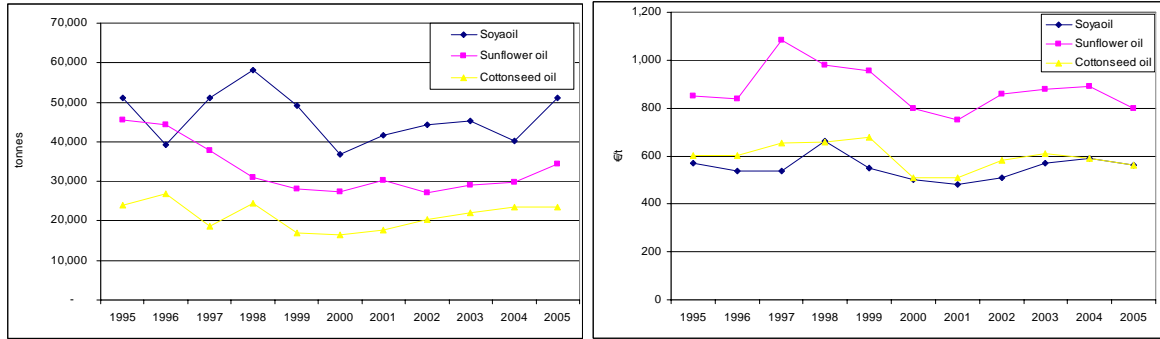


Figure 3: Domestic industrial vegetable oil production (tonnes) (left) and average price (€/tonne) evolution from 1995 to 2005.

Imports- Exports seeds & vegetable oils

Figure 4 presents the imports and exports for the main oilseeds (right) and vegetable oils (left) in Greece during the period 2000- 2005. Substantial quantities of soy and sunflower seeds are being imported while the country exports high quantities of cotton seeds.

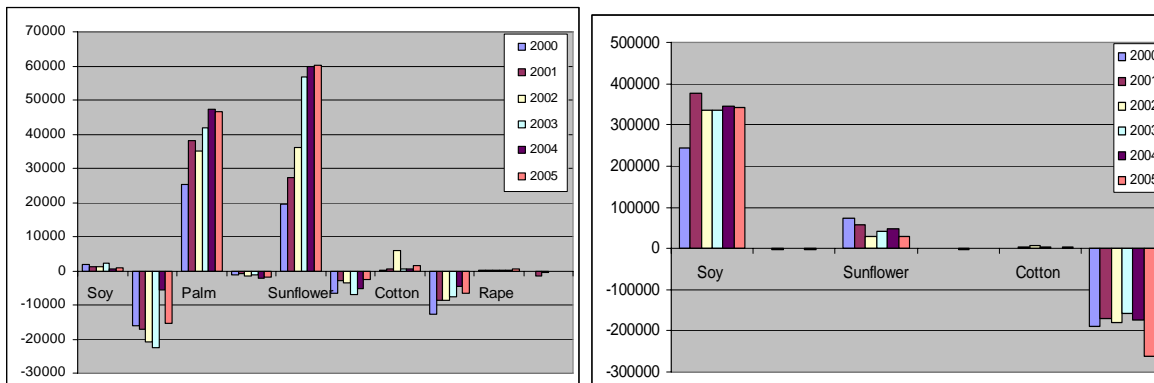


Figure 4: Imports and exports for the main oilseeds (right) and vegetable oils (left) in Greece during the period 2000- 2005

Soy seeds & oil: The presented figures indicate that although the country imports high quantities of seeds (increasing from 245,000 t in 2000 to 341,000 t in 2005) more than half of the oil produced is exported (15,000 t exports from 40,000 t domestic production in 2005).

Sunflower seeds & oil: Greece imports large quantities of seeds but during the period under study the trend is decreasing with values from 75,000 t in 2000 to 29,000 in 2005. Seed exports are negligible while oil exports are not high (ranging from 2,500 t in 2000 to 7,000 t in 2005).

On the contrary oil imports present a rapidly increasing trend (19,000 t in 2000 to 60,000 t in 2005).

Palm oil: During the period 2000- 2005, Greece imported significant quantities of palm oil (30,000 t in 2000 to 47,000 t in 2005). The respective figures for exports remain rather low.

Cotton seeds & oil: Greece is the main European producer of cotton so the imported quantities for seeds are very low while exports represent the highest share among oil seeds with figures ranging from 200.000 t in 2000 to 262.0000 in 2005.

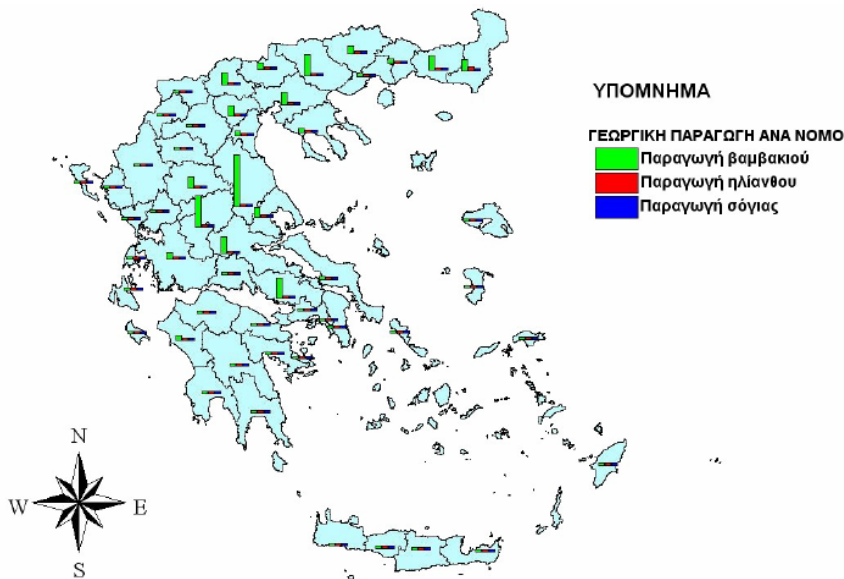
The figures for cottonseed oil are low with exports being 3,900 in 2005 and imports being negligible.

Rape seeds & oil: Rape is a rather new crop for the Greek agricultural system which has shown increasing demand due to the very recent (from 2005) biofuel market. Imports and exports are rather small both for seeds and oil during the period under study. However, there has been a lot of activity in the field of testing new varieties throughout the country. The crop has good adaptation to the Greek climatic conditions and the most recent experiments present yields in the range of 1-4 t/ha (ranged over varieties, sites and irrigation regimes).

4.2 Crops

In terms of oil crops the main existing options comprise of cotton, sunflower and soy (limited area).

In detail sunflower cultivation is concentrated in northern Greece (Thrace has 3,851 ha from the 4,750 total cultivated land) with small areas in central Greece. Cotton is cultivated throughout Greece, mainly in the large plains of Thessaly, Macedonia, Sterea Ellada and less in the Peloponese and totals almost 0.37 million ha of agricultural land (year 2006).



Map 2. Cultivated area per NUTS-3 region for cotton, sunflower and soy.

A critical factor which is expected to restrict the crop profitability in the country is that yields rely highly on irrigation and even then they are still quite low.

Rapeseed can be cultivated in Greece as a winter or spring annual crop. Only experiments and large-scale demonstration fields have been carried out to date. The opportunity to grow rapeseed at low temperatures is an important feature compared with other oleiferous crops grown in Greece. Results from a 4-year (1997–2000) experiment conducted by the Centre for Renewable Energy Sources (www.cres.gr) under an EU-funded project [FAIR CT1946. 2000] were encouraging with average yields up to 17 tonnes dry biomass/ha and 0.7–3 tonnes seed/ ha, depending on the varieties and the prevailing soil/climatic conditions.

5. Domestic biodiesel production

The first domestic biodiesel production plant, operated by Hellenic Biopetroleum Industrial and Commercial S.A. at Kilkis in northern Greece with an annual production capacity of 40,000 tonnes, started operating in December 2005.

A second biodiesel production plant, operated by VERT OIL S.A. in Thessaloniki with an annual production capacity of 25,000 tonnes entered production on July 2006; a third plant, operated by Pavlos N. Pettas Industrial and Commercial S.A., with an annual production capacity of 50,000 tonnes, and same start production date. A fourth plant, with an annual production capacity of 200,000 tonnes, by Agroinvest S.A. at Fthiotida, central Greece started production on November 2006 and a fifth one with an annual production capacity of 80,000 tonnes, by Elinoil S.A. at Volos started operation in December 2006.

According to currently available data from the Ministry of Development, a further eight biodiesel production units are at the initial stages of design and construction: four with a capacity of 5,000 tonnes, two with a capacity of 11,000 tonnes, one with a capacity of 22,000 tonnes and one with a capacity of 100,000 tonnes, with estimated production start dates in the end of 2007.

References

- FAIR CT 96 1946. Brassica carinata: the outset of a new crop for biomass and industrial non-food oil, 1999–2002.

Table 2 Quota distributions per biodiesel producing company for 2006 & 2007

Company	Quota 2006 (t)	Quota 2006 (t)	Quota 2007 (t)
P.N Pettas S.A, Patras		20,280	26,195
Vert Oil S.A, Thessaloniki		6,760	7,605
Biodiesel Ltd, Thessaloniki		1,268	2,958
ELVI-Hellinika Viopetrelaia S.A, Kilkis	2,113	34,645	26,195
Agroinvest S.A, Fthiotida		4,225	9,718
Ekkokistiria-Klostiria B. Ellados S.A, Xanthi		254	2.535
Milloi Soya S.A, Attica (importer)		3,380	0
Bioenergia Ltd, Xanthi, Xanthi		254	0
Staff Colour S.A, Larisa		507	4,225
Mil Oil Hellas S.A, Kilkis		254	676
ELIN Biokafsima S.A, Volos		4,225	6,760
B.K.Biodiesel Ltd, Thessaloniki		338	
Afoi S.A.Trouloi, Heraclion- Crete		85	
Bioenergia – Biokafsima S.A, Attica (importer)		423	
ETB Biokafsima S.A (importer)			3,380
Biodiesel S.A (importer)			1,690
DP Lubricanti SRL (importer)			3,380
Bioenergia Papantoniou S.A, Halkidiki			1,014
Total	2,113	76,895	96,330
Total Production	420	51,545	
Source: YPAN 2006			