The domestic bulk LPG supply chain

Overview of the supply chain

1. LPG is either obtained as a by-product when refining crude oil at refineries and petrochemical plants, or directly from North Sea oil or gas wells. It is subsequently delivered from the supply points in 'liquefied' form to a primary storage facility where it is stored by a process of refrigeration or pressurization. It is then ready for purchase by resellers. Once purchased, the LPG is usually delivered to bulk distribution depots and cylinder-filling plants, some of which are combined on large sites, by means of large bulk road tankers. From distribution depots, smaller delivery tankers carry out deliveries to customers. Alternatively, in fewer cases, LPG is collected from a nearby refinery and delivered directly to the customer. This process from production to domestic household is summarized in Figure 1.

2. Of the major suppliers, BP and Shell operate at all levels of the distribution chain. Flogas and Calor operate only at the retail level. However, Calor's large physical storage may place it in a better position to compete with the vertically-integrated suppliers. The economic issues surrounding vertical integration are discussed in paragraphs 18 to 24 of Appendix F.

Supply points and wholesale

3. Although 40 per cent of the LPG produced in the UK is extracted from gas, as shown in Figure 2, most LPG consumed in the UK is produced from crude oil rather than gas separation. BP told us that this was the result of the following:

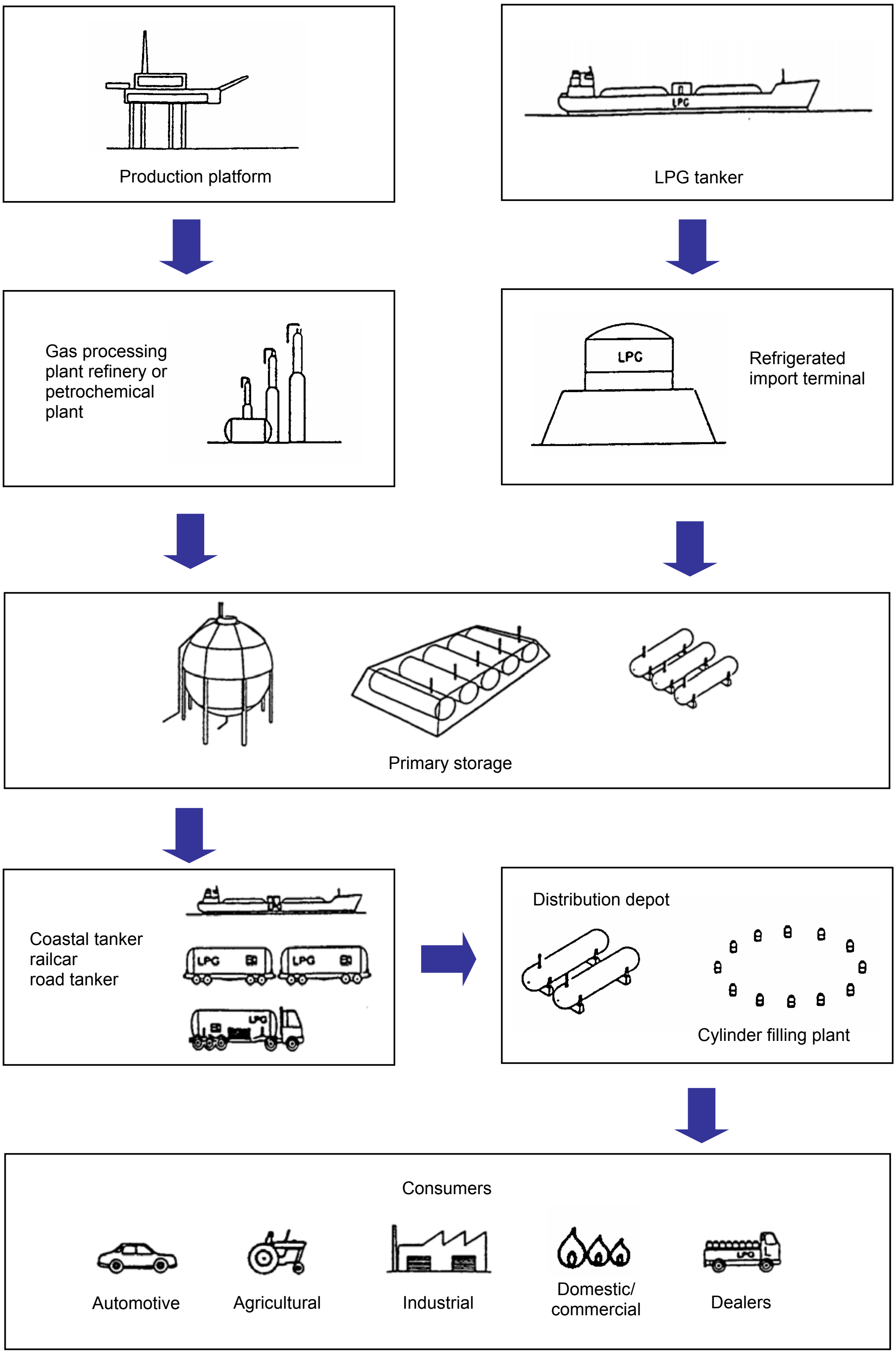
   (a) the availability of LPG resulting from the refinery processes;

   (b) the convenient location of several UK refineries in terms of road access to other areas within the UK; and

   (c) *a* lack of infrastructure for transporting LPG from gas separation plants across the UK, although some LPG produced from gas separation is transported by coastal tanker.

FIGURE 1

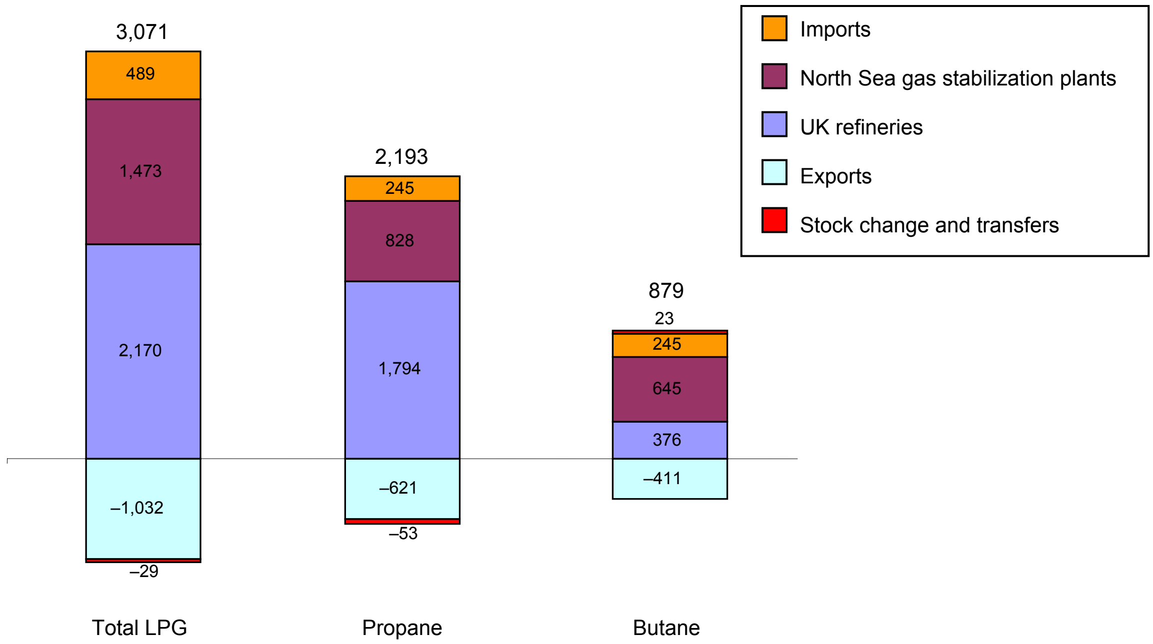
Typical LPG distribution chain



Source: Adapted from LP Gas Association's *LPG Technical Fundamentals*.

FIGURE 2

2004 sources of UK LPG supply (tonnes ’000)

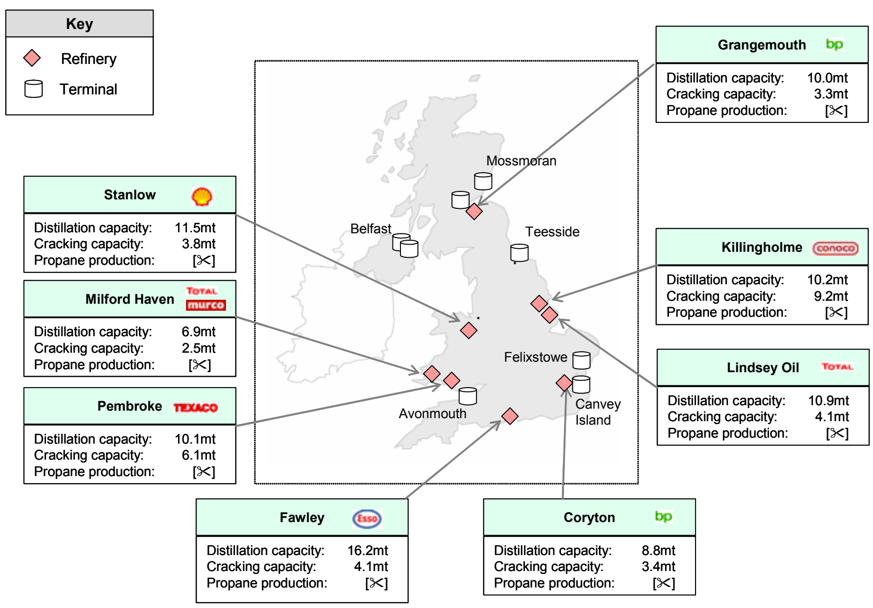


Source: DTI Digest of United Kingdom Energy Statistics 2005.

4. Of the 12 refineries in existence in the UK, eight produce LPG. When LPG is imported into the UK, it is typically received in specialized terminals. Figure 3 shows where refineries and terminals are located.

FIGURE 3

Key UK supply points



Source: DTI *Digest of United Kingdom Energy Statistics 2005*; LPG wholesalers.
Note: In Teesside, Huntsman purchases LPG for its own use as a petrochemical feedstock. It sells approximately [✂] tonnes of propane to UK resellers.

5. Eight companies operate at the wholesale level:

(a) Calor is not a producer of LPG, and operates at the wholesale level to a marginal extent through its three storage terminals. It also has a 60 per cent share of a storage cavern, owned with ConocoPhillips at Immingham.

(b) Shell has one refinery at Stanlow and one terminal at Mossmorran which it shares with Esso. It closed down Shell Haven refinery (in Essex) in 1999.

(c) BP has two refineries located in Grangemouth and Coryton. Coryton's storage is small. It has one terminal at Avonmouth in Bristol, which is supplied from Wytch Farm (in Dorset) or by import.

(d) ConocoPhillips has one refinery in Killingholme and co-owns a cavern with Calor at Immingham.

(e) Huntsman owns a petrochemical plant, which is supplied with LPG from the nearby Teesside gas processing facility. It also purchases LPG via the internationally-traded market and receives product through bulk ship imports.

(f) Esso owns a refinery in Fawley in Southampton, which is the only refinery on the south coast of England.

(g) ChevronTexaco owns one refinery in Pembrokeshire. Its closest competitor is TOTAL (see below) at Milford Haven.

(h) TOTAL has two refineries in the UK. One at Milford Haven, which it co-owns with Murco, a US producer that currently does not sell LPG into the UK. The other is the Lindsey Oil Refinery at Immingham. Shell told us that storage in Milford Haven is so limited that any volume that cannot be sold inland must be exported.

6. We have seen no evidence that supply shortages are a significant issue in the UK market. However, volatility in demand and bad weather conditions occasionally lead to localized shortages during the winter months, when some refineries become unable to supply sufficient quantities of LPG.

Primary storage and transport

7. Table 1 illustrates the extent of storage available to the major suppliers and wholesalers:

TABLE 1 **Propane storage capacity of supply points**

Company	*Refinery (R)/terminal (T)*	*Approx storage capacity*
Calor		
Calor		
BP		
BP		
BP		
Shell		
Esso/Shell		
Esso	✂	
Texaco		
TOTAL		
TOTAL		
Huntsman		
Conoco		
Calor/Conoco		

Source: LPG wholesalers.

Note: Propane storage shown in Table 1 may not be dedicated solely to the UK domestic bulk LPG market. See Appendix B for a description of the various uses of LPG.

8. Supply reliability and price smoothing are the main benefits of large storage. Calor told us [✂]. Shell claims that Calor's joint ownership of the Immingham Cavern has lowered Calor's cost of product to slightly above that of Shell's. [✂] BP told us that, while it has significant storage, it does not have the 'strategic' storage that it believes Calor has.

9. Primary transport is largely outsourced to logistics firms, such as Exel, Suttons and Wincanton, although Calor relies on its own fleet of vehicles.

Depots

10. Suppliers deliver LPG from their own or third-party owned depots or directly from nearby refineries. Figure 4 below shows the locations of the suppliers' depots, whilst the number of depots for each of the major suppliers is summarized in Table 2 as follows:

TABLE 2 **Major suppliers' bulk distribution depots**

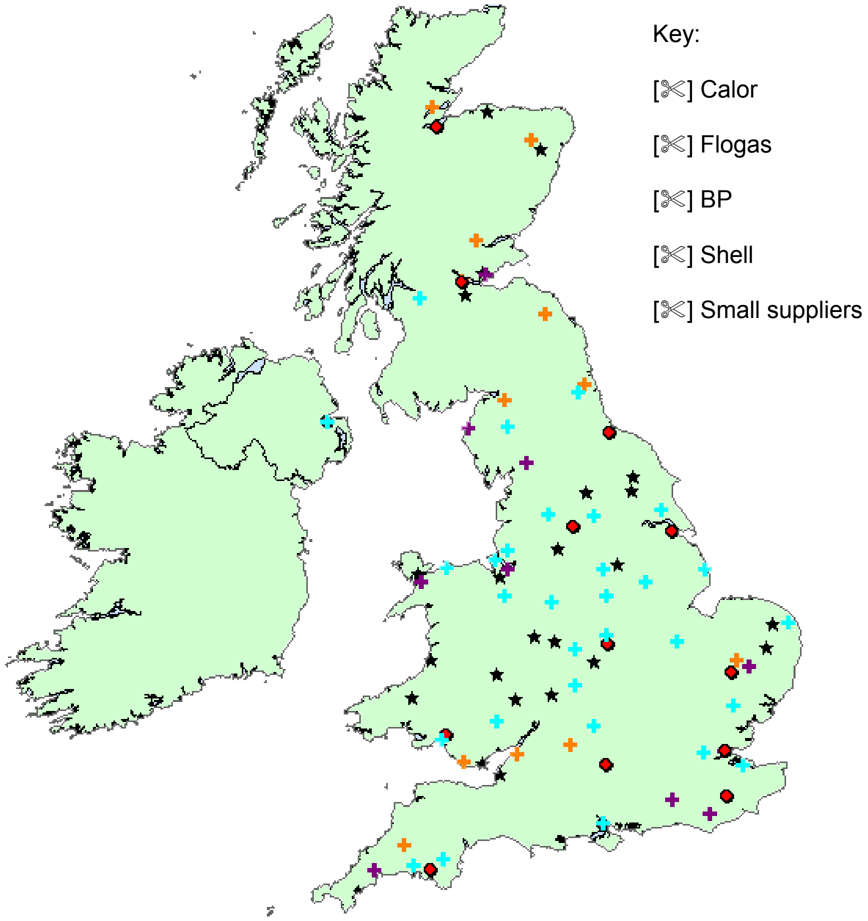
	Number of depots	*Comment*
BP		
Calor		
Flogas		✂
Shell		

Source: Suppliers.

Some suppliers subcontract their domestic deliveries (sometimes to a local company). [✂]

FIGURE 4

Map of UK depot locations



Source: Suppliers, CC analysis.

Note: Certain depots are in very close proximity and, due to overlaps with other depots, cannot be seen on this map.

Northern Ireland

11. In Northern Ireland, the main competitors, Calor NI and Flogas NI, supply their customers from marine terminals in Belfast. Flogas NI buys LPG from Norway and the west coast of Great Britain. Calor NI has supply contracts with [✂].