

Strong Growth Forecast in Floating Production Sector

by

Steve Robertson (Douglas-Westwood Ltd.)
& Georgie MacFarlan (Douglas-Westwood Ltd.)

Results from *'The World Floating Production Report'*, published recently by energy industry analysts Douglas-Westwood, indicate strong growth in FPSO, spar and TLP installations over the next five years. In this article the authors give some of the thinking behind their views.

Background

The first installation of a floating production system (FPS) occurred in 1975 when the *Transworld 58*, a converted semi-submersible drilling rig, was deployed on the **Argyll** field in the UK sector of the North Sea. Since then, a number of different floating production systems have evolved and four main types can be identified: Floating Production Storage & Offloading vessels (FPSOs), Floating Production Semi-submersibles (FPSSs), Tension Leg Platforms (TLPs) and spars. Production barges have also been deployed in the benign environments of the Asia Pacific and West African regions.

FPSOs are ship-shaped vessels which are deployed to produce hydrocarbons from wells located on the seabed (subsea wells) or from wells located on offshore platforms. Their main distinguishing factor relative to other forms of FPS is their ability to store produced fluids which are then offloaded into shuttle tankers. Most FPSOs are converted oil tankers.

The key components of an FPSO are:

- a) The vessel itself, which may be a newbuild or, more usually, a tanker conversion;
- b) The mooring system, which on many modern FPSOs is built upon a geostationary 'turret' mounted inside the hull and which leaves the vessel free to rotate to head into the prevailing weather. Such mooring systems are based on patented technologies and comprise a promising niche market;
- c) The process plant, whose configuration will depend largely on reservoir characteristics and environmental factors; water and/or gas injection and gas-lift facilities are commonly included.

It should also be noted that a number of companies are proposing FPSOs which incorporate drilling facilities (FPDSOs). These designs tend to be targeted for deployment in remote and/or harsh environments such as the Norwegian Sea. Although the FPDSO concept holds out attractive possibilities, there are currently no indications that it will be adopted in the near future.

The world's first FPSO was introduced in 1977, on Shell's **Castellon** field in WD 117m in the Spanish Mediterranean. The Brazilian operator Petrobras followed this lead by converting the *Presidente Prudente de Moraes* tanker and deploying it on the **Garoupa** field in 1978.

Recent years have seen a rapid expansion of the world's FPSO fleet, prompted in part by an increased demand for drilling units which has reduced the number of semi-submersible rigs available for conversion to production platforms. International legislation (introduced largely in response to the Exxon Valdez disaster) which phases in requirements that tankers be fitted with double hulls provides further stimulus, since conversion of otherwise obsolete single-hull tankers into FPSOs enables the profitable re-utilization of depreciated assets.

FPSOs dominate the global floating production scene. As of year-end 2003, there have been 129 FPSO deployments worldwide – more than all the other floating production systems (FPSSs, TLPs and spars) put together.

The reasons for the popularity of FPSOs as host facilities are not difficult to fathom. They offer large deck areas for processing facilities and plenty of vertical load-bearing capability (to resist mooring and riser loads), all at economical cost and with relatively short lead times, since tankers are produced in large numbers from shipyards worldwide.

FPSOs also have the advantages of allowing more flexible oil distribution and providing storage capacity for produced oil which can eliminate the need to install pipeline export networks. This factor is relevant off West Africa, for example, where offshore pipeline infrastructure is very limited and restricted to shallow waters. Off Brazil, the existing offshore infrastructure is working close to capacity and the extreme water depths of new fields mean that costs of shuttle tanker offtake from FPSOs compare very favourably with the costs of installing additional export pipelines.

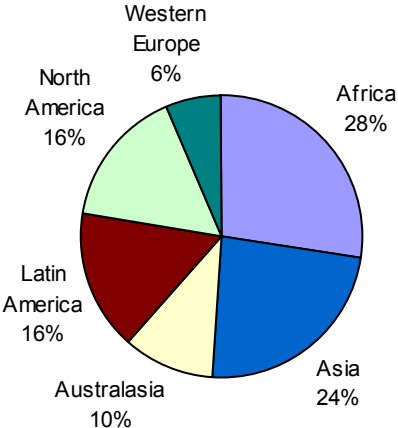
Development of the FPS Sector

Initial FPS installations featured converted semi-submersible drilling rigs and in the case of FPSOs, converted tankers. These units tended to be deployed on marginal fields where the water depth and/or uncertainties as to the volume of recoverable reserves meant that development using a conventional fixed platform solution was too commercially risky. The FPS concept has since proved to be a cost-effective method of developing both marginal and world-class offshore fields. Present FPS applications cover a very wide range of offshore developments in all water depths and environments.

The expansion of the world’s floating production fleet has been particularly rapid over the last decade and increasingly dominated by FPSOs. Although FPSOs numbers continue to grow, future identified prospects show that other vessel types, particularly TLPs and spars, may be increasingly common amongst new installations. It is important to note, however, that these are *prospects*, not forecasts, and it is likely that some of the identified prospects may either be delayed or not come to fruition at all.

Future FPS Prospects by Region

Turning to the prospects for individual regions, Africa, Asia and North America all show strong numbers of prospective installations for the period to 2008. Activity in Latin America (predominantly off Brazil) appears likely to remain fairly constant, while Western Europe shows evidence of a fairly strong decline in activity. Only eight FPS installations are in prospect here for the 2004-2008 period as opposed to the 13 installations recorded in the 1999-2003 period. The region is thus the only one to register a decline in the number of vessels installed relative to the previous 5-year period.



The regional share of the 124 identified FPS prospects planned and possible for the 2004-2008 period is shown in **figure 1**. Combined, Africa and Asia represent more than 50% of these prospective installations, with North America and Latin America together accounting for another 32%.

Figure 1: Regional Shares of Identified FPS Prospects 2004-2008

Source: ‘The World Floating Production Database’ – Douglas-Westwood Ltd

Capex Forecast

As can be seen in **figure 2**, FPSOs represent by far the largest segment of the market, accounting for 65% of the forecast Capex. The remaining expenditure is fairly evenly distributed between the other three FPS types (FPSSs, TLPs and spars) giving a total FPS Capex forecast for the period of \$31 billion.

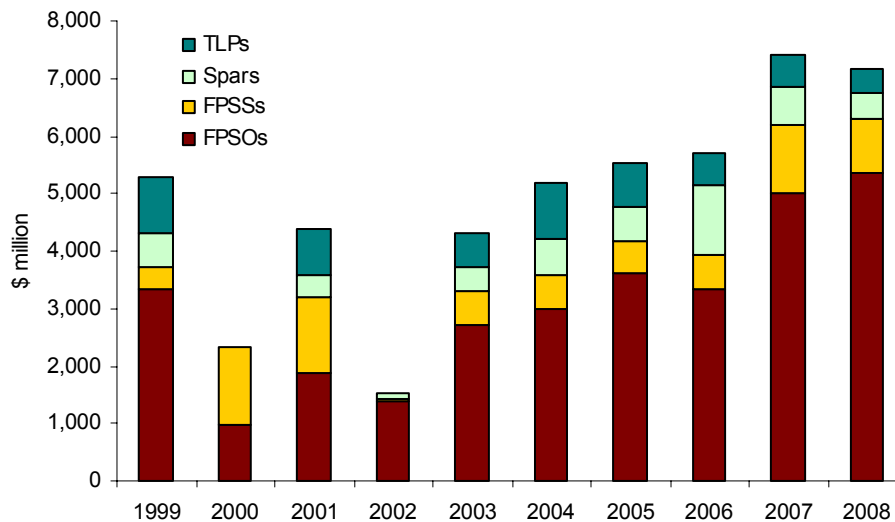


Figure 2: Global FPS Capex by Vessel Type 1999-2008 (\$ million)

Source: *'The World Floating Production Report 2004-2008'* – Douglas-Westwood

Within the FPSO segment, the exact mix of newbuilds, conversions and upgrades/redeployments that will be required to meet demand is impossible to determine precisely, though this will obviously have a strong effect on the Capex levels within the segment. In our forecasts we have assumed that the supply mix will include 28 conversions and 19 upgrades/redeployments.

In our analysis we have identified four main drivers behind the continued demand growth within the FPS sector:

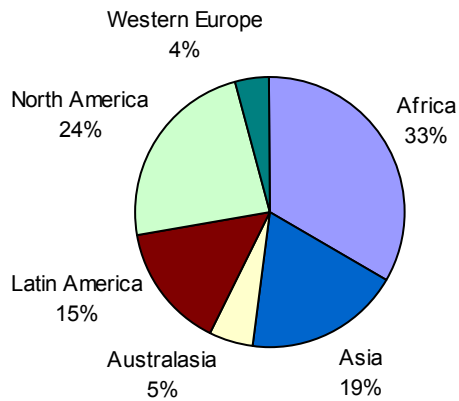
1. Continuing expansion in the use of subsea production technologies;
2. The industry's move into deep water areas;
3. Exploitation of marginal fields;
4. Growing emphasis on 'fast-track' and/or phased developments.

On the supply side, the influence of globalisation is already apparent but is likely to be somewhat offset by national insistence on local content in the delivery of floating production systems and other components of offshore developments generally.

An active leasing market has emerged in the FPSO segment in particular – roughly 40% of the world's FPSO fleet, and just under half of the North Sea fleet, is owned by leasing contractors. In recent years, contractors have picked up a number of significant project awards based on the deployment of converted vessels – predominantly tankers and semi-submersible drilling rigs. The redeployment of modified/upgraded vessels, especially in the leased FPSO segment, is likely to play an increasingly important role in meeting the growth in market demand.

Regional Markets

Africa and Asia account for more than half of the 115 vessels forecast for installation over the 2004-2008 period. North America is the next most important region in numerical terms (24), followed by Latin America (16), Australasia (8) and Western Europe (5).



In terms of market value, the world's three major deepwater regions – Africa, North America and Latin America – account for 72% of forecast global Capex, as shown in **figure 3**. The relatively benign environments and shallow waters in which most of the FPS prospects in Asia are located enable cheaper FPS solutions to be adopted. Thus, although the region has 31 FPS units forecast for the period, its Capex (\$5.8 billion) is lower than that forecast for North America and not far ahead of Latin America (Brazil) – regions for which newbuild solutions and/or higher specification vessels tend to be required.

Figure 3: Regional Shares of FPS Capex 2004-2008

Source: 'The World Floating Production Report 2004-2008' – Douglas-Westwood Ltd.

We believe that our market forecasts may be slightly conservative and that activity within the FPS sector over the period to 2008 could exceed the levels presented here. There are two main reasons for this. The first of these relates to the potential for new floater projects to emerge as a result of ongoing exploration activities, and the second to the lack of a defined development strategy for some known prospects.

The FSO Market

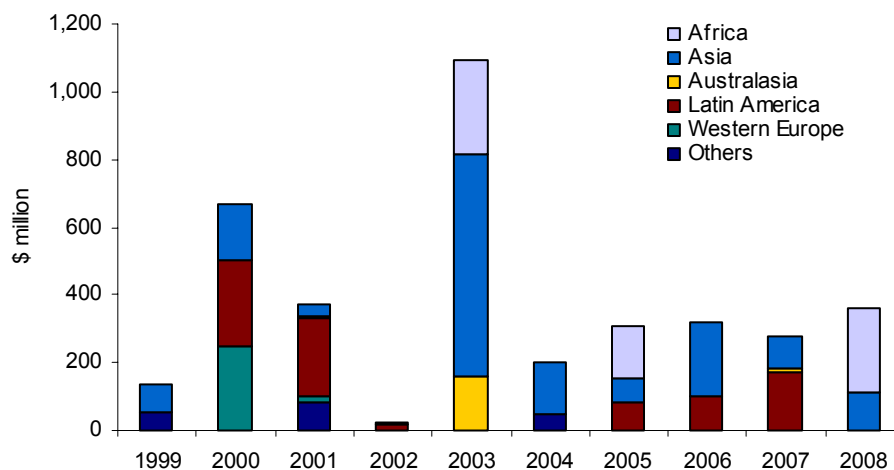


Figure 4: FSO Capex by Region 1999-2008

Source: The World Floating Production Report 2004-2008

It should be noted that since Floating Storage and Offloading (FSO) vessels do not include any production equipment we exclude them from our floating production system forecasts and present them separately.

The World Floating Production Database indicates that over the 1999-2003 period there were 27 FSO installations and that the estimated capital expenditure required to complete these installations amounted to some \$2.3 billion.

Over the 2004-2008 period we anticipate a total of 22 FSO installations worldwide, with the majority of these occurring in Asia. Total Capex is forecast at nearly \$1.5 billion. The FSO market can be quite erratic – last year (2003) has seen an unprecedented number of installations including newbuild vessels on **Amenam** (Nigeria), **Cakerawala** (Thailand) and **Bayu Undan** (Australia) – and the relatively short lead time on FSO installations means that actual activity over the five-year period may well exceed the levels presented here.

Further information is available at www.dw-1.com. The authors can be contacted via admin@dw-1.com

The Authors

Steve Robertson

Steve is a market analyst for Douglas-Westwood and is lead author of the *World Floating Production Report* and the recent *World LNG & GTL Report*. Previously he has undertaken research on the firm's projects for investment banks and contributed to a number of other DWL studies including *The Subsea Processing Gamechanger Report*, *The World Offshore Drilling Report* and *The World Offshore Pipelines Report*. Steve holds a BSc in Computing and Economics and prior to joining Douglas-Westwood worked in the defence and financial sectors. He is a member of the Institute of Petroleum and the Society for Underwater Technology.

Georgie MacFarlan

Georgie is an analyst for Douglas-Westwood and manages the *World Floating Production Database*. She has also contributed to the *World Floating Production Report*, along with a number of the firm's studies for oil majors and government departments. Georgie has previously managed data systems for a major UK charity and also for the Hampshire Constabulary, preparing performance indicator surveys for the Home Office. She holds a BSc in Sociology.