THE IMPLICATION OF THE STRUCTURAL CHANGES IN WORLD SHIPPING INDUSTRY TO THE FINANCIAL POSITION OF TSAKOS ENERGY NAVIGATION LTD.

by

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ABSTRACT

The objective of this paper is to provide a financial analysis of the selected company; Tsakos Energy Navigation Ltd. This paper systematically addresses two questions, how the recent international market trends affect the shipping market cycle and what are the implications of those trends on the financial performance and fundamental value of the selected firm.

Throughout the analysis, the positioning of the selected firm will be analyzed in depth to understand how it has responded to the increased demand for shipping services because of the world trade growth. Recently, the industry has enjoyed its longest sustained period of prosperity. However, shipping markets are cyclical and notoriously volatile, and today's unprecedented markets are unlikely to continue for ever.

The international shipping industry is responsible for the carriage of 90 per cent of world trade and is the life blood of the global economy. Without shipping, intercontinental trade, the bulk transport of raw materials, and the import - export of goods would simply not be possible.

Due to China's increasing integration into the global economy, growth in world trade is now more marked than usual. Positive signals from the WTO negotiations make it likely that the process of global economic integration will continue at a good pace. The economic growth in China is now considered to be one of the most important stimulus to growth for the tanker, chemical, bulk and containers trades.

The terminus of this paper is to describe and develop an appropriate valuation model in order to present how the fundamental value of the selected company was affected by the factors that were described above.

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All references to dollars, ($) are to United States dollars, unless otherwise stated.

"Tons" refers to metric tons, unless otherwise stated.

Because of rounding, details and percentages presented in tables do not necessarily add up to the totals.

Two dots, (..) indicate that data are not available or are not separately reported.

A hyphen, (-) signifies that the amount is null or less than half the unit used.

1 INTRODUCTION

The recent trends in the shipping industry suggest that the market is facing the most extreme shipping cycle peak for more than eighty years. Even 2000 pales into insignificance compared with the current level of earnings, especially in the tanker segment. But the biggest shipping booms in the last fifty years have been followed by equally extreme recessions. The 1956 boom was followed by a long recession and the 1973 freight boom was followed by the notorious 1980s recession. Could this cycle follow the same pattern? Is it a new paradigm, a bubble or just a rather frothy shipping cycle?

The longer the boom goes on, the more nervous the market becomes. Shipping industry is so capital intensive with a history of sudden freight market booms and collapses, that bad decisions at the top of the cycle can blight any company. Many of the analysts that are involved in the shipping industry suggest that forecasting in shipping should not be the starting point as they have failed many times to predict the length and timing of the shipping cycles[1].

The purpose of this paper is to analyse and understand the dynamics of the tanker industry and identify these market drivers that affect the industry and mainly the financial position of the selected company in order to develop the valuation model and forecast the company's intrinsic value.

[1] Martin Stopford, Clarkson Research, Maritime Cyprus, September 2005

We will proceed in three steps. We begin with the analysis of the tanker industry and the identification of the market drivers. Then, we will introduce Tsakos Energy Navigation Ltd., investigate the key elements that affect the company's financial position and explain how these drivers have been considered by the analyst in order to develop the valuation model. Finally, we will present the methodology that have been used for the future cash flows projections and end up with the fair value of the selected companies and our conclusions. A glossary of terms is included in the Appendix A, for better understanding of the terminology for the tanker industry.

2
DATA & METHODOLOGY

2.1 Literature Review

A review of three main literatures on the tanker industry was conducted. One was about the current trends and future prospects in the tanker industry and its key factors. The second part of the literature used in this paper includes the financial and other corporate data collected from the financial reports of the selected company as well from other useful sources. The final piece of literature reviewed was related to the valuation model and the techniques for financial modeling and forecasting.

The valuation model that has been constructed for the purposes of this paper is based on fundamental discounted cash flow analysis. The primary source for the data that have been used in the valuation model as inputs is the latest six year financial reports of the selected company and the U.S. Securities and Exchange Commission filings (SEC). While both contain large amounts of relevant data, it is the researcher opinion that they are both become data dumps as companies become increasingly risk averse. In addition, the DataStream dataset has been used with respect to the general accounting principles. Meanwhile, industry's related reports have been used extensively in order to collect historical data and extract estimates for the projections.

Internet monitoring and data mining have been useful to an extend in order to eliminate any anomalies created by the analysis. At the same time we avoid to use these data and information that could produce a statistical relationship that is

coincidental and thus misleading. In order to support the conclusion, the analyst used different valuation models and methods including the residual earnings and the abnormal growth earnings models, the liquidation valuation and the method of comparables. Since in our case the same dataset is the input for different valuation models and the valuation procedure is repeated for each of these models, the probability of producing inaccurate data is low. However, it has to be mentioned that valuation is a subjective procedure based on the assumptions of each analyst. Finally, we avoid any misleading predictive power of our data by developing different scenarios based on different initial assumptions each time. By doing that, we exclude the case of where it could have been possible that we had selected our assumptions randomly.

2.2 Methodology

Although the intrinsic value depends on future expectations, a thorough historic analysis of the financial, strategic and competitive evolution of the company helps assess the forecast's consistency. The basic stages followed in this paper, in order to perform an accurate valuation by discounting the future cash flows are:

Historic and strategic analysis of the company and the tanker industry, including the financial analysis of the income statement, balance sheet and the cash flows generated by the company. Understanding the evolution of the company's investments and financing. Analysis of the financial health, and the future business risks that the company might face.

Strategic and competitive analysis is useful in order to have a better understanding of the industry evolution and be able to identify the value drivers along with the company's competitive position and this of its main competitors.

Next step is the projection of the future expected free cash flows which includes the forecasting of the company's financial statements, and the horizon - terminal value. In order to be more accurate various scenarios were forecasted about the company, the industry and the position of its main competitors. Then, the analyst has to check the consistency between the cash flow forecasts and the historic figures along with the strategic analysis that had been conducted in the previous stage.

In order to discount the projected cash flows and the terminal value of the company we have to determine the cost of capital. Thereafter, the analyst is able to calculate the value of the equity and the fair value of the company's stock.

Finally, the analyst has to interpret the results. One way, is by benchmarking the value obtained; compare the selected company with the industry peers. In the case that the selected company is creating value, the analyst has to identify the value creation and answer to the question of sustainability. In the case of value destruction the analyst has to define the parameters that are responsible for this undesirable outcome.

3 International Market trends

Introduction

In 2004, world economic output grew by 4.1 per cent over that of 2003, when it had grown 2.7 per cent, being this way the highest increase in a decade. The developed market-economy countries experienced growth of 3.2 per cent, while developing countries recorded an average increase of 6.5 per cent. For 2005, growth forecasts for world output are cautiously conservative, around 3.1 per cent.

The volume of world merchandise exports grew by 13 per cent, compared with 6 per cent in 2003. This growth reflects the strong performance of China and the transition economies. China's imports expanded by 40 per cent in nominal dollar terms while its exports expanded by 35 per cent. India's exports grew by 20 per cent, well in excess of import growth. The total OECD industrial production index increased by 2.9 per cent, reflecting the performance of the United States, Japan and, to a lesser extent, European OECD countries. North America's continued import growth was much stronger than its own export growth.

World seaborne trade[2] recorded another consecutive annual increase, reaching a record high of 6.76 billion tons. The annual growth rate was 4.3 per cent, well below the 5.8 per cent increase for 2003. Global maritime trade growth is likely to continue to grow during 2005.

[2] Goods loaded

World Economic Background

Preliminary data available for 2004 indicate that growth in world output was 3.8 per cent. This result reflected the fact that virtually all regions of the world experienced simultaneous positive economic growth, at differing paces. Economic recovery in developed countries led to 3.2 per cent growth, well over the 1.7 per cent of the previous year. The economic performance of the United States was good, particularly during the first half of the year, with sustained domestic demand and modest increases in real interest rates that kept these at relatively low levels and resulted in output growth of 4.4 per cent for the year. The Japanese economy continued its expansion, almost doubling its growth rate to 2.6 per cent. The European Union recorded the weakest growth rate among developed economies at 2.1 per cent, but this rate was remarkable compared with the dismal 0.9 per cent of the previous year, and was achieved in an environment of low interest rates.

Table 1: World economic growth, 2001–2004[a]

(percentage)

Region / Country[b]	2001	2002	2003	2004 [c]
World	1.3	1.8	2.5	3.8
Developed countries	1.0	1.3	1.7	3.2
of which:				
Japan	1.0	1.3	1.7	2.6
United States	0.3	2.4	3.0	4.4
European Union	1.7	1.1	0.9	2.1
of which:				
Germany	0.9	0.2	-0.1	1.0
France	2.1	1.2	0.5	2.1
Italy	1.8	0.4	0.3	1.0
United Kingdom	2.1	1.7	2.2	3.1
South-East Europe and CIS	5.6	4.9	6.9	7.5
Developing countries	2.4	3.5	4.7	6.4
Developing countries excluding China	1.5	2.7	3.9	5.7

Source: UNCTAD secretariat

a Calculations are based on GDP in constant 1995 dollars.

b Region and country groups correspond to those defined in the UNCTAD Handbook of Statistics, 2004.

c Preliminary.

Economic output for developing economies grew 6.4 per cent, well above the world average. The highest growth rate, 7.5 per cent, was recorded by countries in South-East Europe and the Commonwealth of Independent States. Developing countries in South America had output growth of 6 per cent, the highest since 1986. Developing countries in Africa and the Middle East reached output growth of about 4 per cent, just below the world average for the year, while sub-Saharan African countries recorded an impressive 5.1 per cent economic growth during 2004. The star performer was again China, whose output growth reached 9.5 per cent, fuelled by strong domestic demand and investment and continuing high levels of exports. India, pursuing economic liberalization policies, recorded output growth of 7.3 per cent.

Prospects

Forecasts of world economic output growth for 2005, while cautiously optimistic, have been contingent on the permanence of current oil prices, the sustainability of economic growth in the Far East and concern about ballooning public deficits in major developed economies. Forecasts are around 3 per cent.

3.1.1 China's impact on global shipping

After China became a member of the WTO at the end of 2001, the extremely high growth in the country's exports and imports helped stimulate the world economy. This has helped lift the prices of key raw materials, including oil and steel, and has been an important factor in the freight market boom, [Figure 1]. Last year, China alone accounted for a third of world oil demand growth and has become the world's second largest net oil importer after the United States. Chinese oil imports have risen by an average of 30 per cent annually during the past three years. According to market analysts, oil imports will continue to rise strongly, but by lower percentage amounts. In light of the fast growth of import demand, the Chinese government is seriously considering to build up a strategic oil reserve.

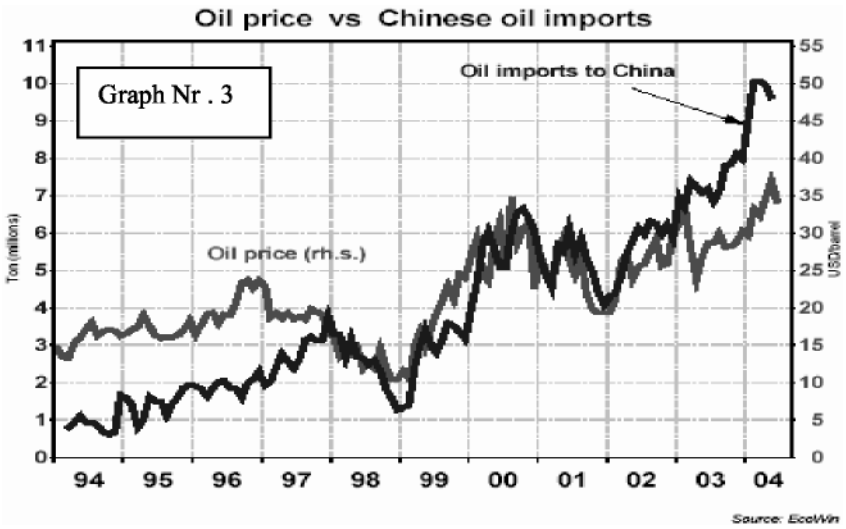

Figure 1: Oil price and Chinese oil imports evolution
[*Source*: OECD, 2004]

The above indicates that China's oil imports are – far more than those of the United States – boosting the oil trade. China's oil demand contributes about 1 per cent to global oil consumption growth. That is more than 40 per cent of total world demand growth. The contribution to oil freight is even stronger. Over the past eight years, China's oil consumption has risen by an average of 6.5 per cent per year, [Figure 2]. This is very high, but considering that economic growth has averaged 8.5 per cent during the period, the increase in oil consumption is not so surprising.

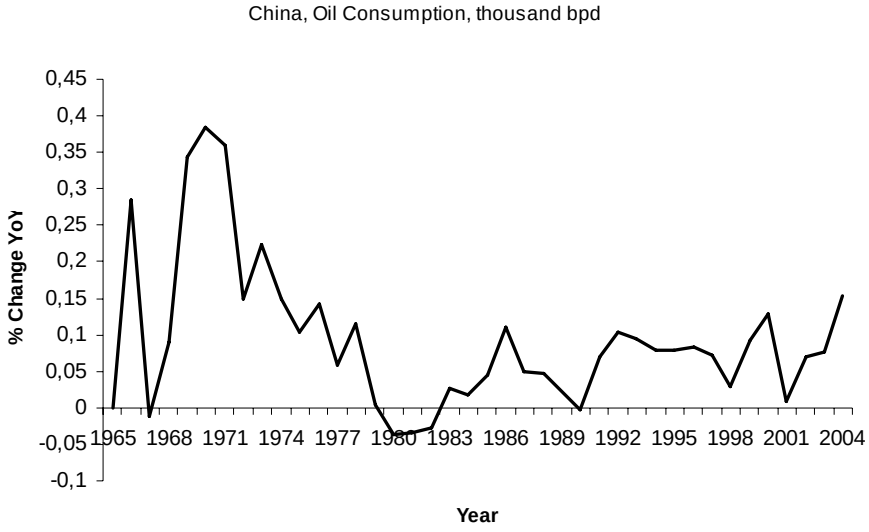

Figure 2: Chinese oil consumption per cent change Year over Year
[*Source*: BP Statistical Review of World Energy, 2005]

Assuming that China's economy will continue to grow strongly during the coming years, oil imports will continue to rise strongly. The percentage rise in these imports will, however, decline – probably by 15-20 per cent in the coming years. Even so, it will make a strong contribution to freight requirements and the need for increased output. This will contribute to continuing strong growth in the requirement for oil transport.

3.2 International Shipping Trends

The global marine industry reached a value of $100.7 billion in 2003, having grown at a compound annual growth rate (CAGR) of 1.6 per cent in the 1999-2003 periods. Since 2001, the industry has been growing by just over 1 per cent a year, the use of marine transportation remaining a popular mode of transporting large quantities of goods over long distances. Going forward, the industry is expected to perform at a stronger level than in recent years. By 2008, the industry is forecast to have reached a value of $116.6 billion, a predicted CAGR of 3.0 per cent over the 2003-2008 periods, slightly below the CAGR for the 1999-2003 periods of 4.6 per cent. However, with the industry expected to be worth around $116.6 billion in 2008, those operating within the global marine industry can look forward to a better performing industry than has recently been the case. The industry is set for a period of increasing strength. The annual industry growth is forecast to rise from 1.6 per cent in 2003 to a high of 3.5 per cent in 2008, [Table 2].

Table 2: Global marine industry value, 1999 – 2004

Year	Value ($ billion)	% Growth	Volume (billion tons)	% Growth
1999	84,2		5,5	
2000	99,4	18,05%	5,8	5,45%
2001	98,0	-1,41%	5,7	-1,72%
2002	99,1	1,12%	5,8	1,75%
2003	100,7	1,61%	5,9	1,72%
2004	102,5	1,79%	6,0	1,69%
CAGR, 1999 - 2004		4,01%		1,76%

Source:OECD

In terms of volume, the industry reached a total of 5.9 billion tons of goods in 2003. Volume growth patterns have broadly matched value growth since 1999 and this trend is expected to continue through to 2008. Consistent volume increases are forecast during the next five years, highlighting the continued recovery of the transportation industries. In 2008, the marine industry is expected to have reached a volume of 6.4 billion tons, having grown at a CAGR of 1.8 per cent since 2003, [Table 3].

Table 3: Global Marine Industry Value Forecast, 2005 - 2008

Year	Value	% Growth	Volume	% Growth	($ billion)
2004	102,5		5,9		
2005	105,5	2,93%	6,0	1,69%	
2006	108,9	3,22%	6,1	1,67%	
2007	112,6	3,40%	6,3	3,28%	
2008	116,6	3,55%	6,4	1,59%	
CAGR, 2005 - 2008		3,27%		2,05%	

*Source:*OECD

By volume, the largest sector of the marine industry is dry cargo, which accounts for over 63.40 per cent of the industry volume share. This represented approximately 3.7 billion tons in 2003. The other sector of the industry is tanker cargo, which accounts for 36.60 per cent of the industry or 2.1 billion tons.

The largest market for the marine industry is the Asia – Pacific region, which generates 30.6 per cent of the industry's value. Europe accounts for a further 27.2 per cent of the industry's value, making it the second largest market globally and the U.S. alone is responsible for 16.9 per cent of the industry's value.

In 2008 the global marine industry is forecast to have a volume of 6.4 billion tonnes, an increase of 9.5 per cent since 2003. The compound annual growth rate of the industry volume in the period 2003-2008 is predicted to be 1.8 per cent. The strongest growth is predicted for 2007 when the industry is forecast to grow by 3.28 per cent.

3.2.1 World seaborne trade

World seaborne trade increased strongly in 2004, reaching 6.76 billion tons of loaded goods. The annual growth rate, calculated with the provisional data available for year 2004, reached 4.3 per cent.

3.3 Tanker shipping market

Seaborne trade in tankers

In 2004 total world shipments of tanker cargoes reached 2.32 billion tons, after increasing by 4.2 per cent during the year. About 76.4 per cent of this tanker trade was in crude oil, with the remainder in petroleum products. The share of tanker shipments in overall world seaborne trade decreased slightly to 34.3 per cent.

Table 4: Development of international seaborne trade, selected years[a]

Development of international seaborne trade, selected years[a]
(goods loaded)

Year	Tanker cargo		Dry cargo				Total (all goods)	
			Total		*of which* main bulk commodities[b]			
	million tons	% change	million tons	% change	million tons	% change	million tons	% change
1970	1 442		1 124		448		2 566	
1980	1 871		1 833		796		3 704	
1990	1 755		2 253		968		4 008	
2000	**2 163**		3 821		1 288		5 983	
2001	**2 177**	**0.7**	3 844	0.6	1 331	3.3	6 020	0.6
2002	**2 146**	**-1.4**	3 981	3.6	1 352	1.6	6 127	1.8
2003	**2 223**	**3.6**	4 257	6.9	1 475	9.1	6 480	5.8
2004[c]	**2 316**	**4.2**	4 442	4.4	1 587	7.6	6 758	4.3

Source: UNCTAD secretariat
a Includes international cargoes loaded at ports of the Great Lakes and St. Lawrence system for unloading at ports of the same system.
b Iron ore, grain, coal, bauxite/alumina and phosphate.
c Estimates.

Crude oil production

In 2004 crude oil production averaged 80.3 million barrels per day (mbpd) — an increase of 4.5 per cent over the previous year's figures. Oil production in OECD countries, notably the U.S., Mexico, Norway and oil-producing countries within the EU decreased by 1.9 per cent to 20.7 mbpd, so that this group's market share fell for a second consecutive year to 25.3 per cent. World economic growth is expected to provide a growth of 2 per cent or more in the demand for crude oil.

Natural gas production

In 2004 production of natural gas reached 2,618.5 billion cubic metres (bcm), an increase of 2.8 per cent from 2003, and almost equivalent to the 2000 figure. This production is equivalent to 2,356.6 million tons of oil or 49 mbpd. Major producers are the Russian Federation with 578.6 bcm and the U.S. with 549.5 bcm; these countries together account for 43.1 per cent of total production. Prospects for increasing natural gas production are good because of growing demand in the United States, Europe, Japan and China.

Crude oil shipments

In 2004, crude oil seaborne shipments increased by 4.8 per cent to 1.77 billion tons. Major loading areas continued to be developing countries in Western Asia with 899.1 million tons, in West Africa with 184.8 million tons, in North Africa with

128.1 million tons and around the Caribbean with 216.1 million tons. Main discharging areas were located in developed market-economy countries in North America with 500.5 million tons, in Europe with 434.1 million tons and in Japan with 215 million tons. Developing countries in South and East Asia took 299.7 million tons during 2004. The major events of the year were the substantial increases in Russian exports, to 124.3 million tons, and Chinese imports, to 99.5 million tons.

Petroleum product shipments

The global trade in petroleum products increased significantly in 2004 to 546 million tons. The pattern and volume of shipments were similar to those of past years.

LNG shipments

LNG shipments grew by 12.5 per cent during 2003 to reach 168.8 bcm of natural gas. This is about 6.4 per cent of the world production. The largest importing area is the Far East, where major importers continued to be Japan with 79.8 bcm and the Republic of Korea with 26.2 bcm. Supplies came from Indonesia (with 35.6 bcm), Malaysia (with 23.4 bcm), Qatar (with 19.2 bcm) and Australia (with 10.5 bcm). The share of Persian Gulf supplies is poised to grow as Saudi Arabia and Qatar develop new export capacity for consumers in the Far East and North America.

3.3.1 World Fleet Structure

Since the beginning of 2005 the tonnage of oil tankers has grown by a healthy 5.2 per cent compared with the 6 per cent of 2004. Oil tankers and dry bulk cargo ships represented 73.3 per cent of total tonnage, a slight increase from 72.9 per cent in 2004. The fleet of general cargo ships decreased again in 2004 and at a faster rate than in the previous year, namely by 2.9 per cent; this category now represents 10.3 per cent of the total world fleet. The deadweight tonnage of liquid gas carriers (mainly LNG and LPG carriers) and ferries/passenger ships has been increasing steadily, [Table 5].

Table 5: World fleet size by principal types of vessel, 2003–2005[a]

(beginning-of-year figures, in thousands of dwt)

Principal types	2003	2004	2005	Percentage change 2004/2005
Oil tankers	**304,396**	**316,759**	**336,156**	6.1
	36.1%	***37.0%***	***37.5%***	
Bulk carriers	300,131	307,661	320,584	4.2
	35.6%	*35.9%*	*35.8%*	
Ore/bulk/oil	12,612	12,110	9,695	-19.9
	1.5%	*1.4%*	*1.1%*	
Ore/bulk	287,519	295,551	310,889	5.2
	34.1%	*34.5%*	*34.7%*	
General cargo ships				-2.9
	97,185	94,768	92,048	
	11.5%	*11.1%*	*10.3%*	
Container ships				8.4
	82,793	90,462	98,064	
	9.8%	*10.6%*	*10.9%*	
Other types of ships				3.5
	59,730	47,324	48,991	
	7.1%	*5.5%*	*5.5%*	
Liquefied gas carriers				7.6
	19,469	**20,947**	**22,546**	
	2.3%	***2.4%***	***2.5%***	
Chemical tankers				3.6
	8,027	8,004	8,290	
	1.0%	*0.9%*	*0.9%*	
Miscellaneous tankers				5.7
	906	947	1 001	
	0.1%	*0.1%*	*0.1%*	
Ferries and passenger ships				0.5
	5,495	5,561	5,589	
	0.7	*0.6*	*0.6*	
Other	25,833	11,865	11,565	-2.5
	3.1	*1.4*	*1.3*	
World total	844,235	856,974	895,843	4.5
	100.0	*100.0*	*100.0*	

Source: Compiled by the UNCTAD secretariat on the basis of data supplied by Lloyd's Register – Fairplay.
a Percentage shares are shown in italics.

3.3.2 Deliveries of Newbuildings

Newbuilding activities attained the highest level ever recorded in terms of deadweight tons, with deliveries totalling 49.4 million dwt in 2004, a marginal increase over the already record deliveries in 2003, 49.2 million dwt. The total number of vessels delivered increased 7 per cent, to 1,827 units from 1,707 units in 2003. This high level of delivery was sustained primarily thanks to tanker deliveries of 27.6 million dwt, down 1.8 million dwt from record deliveries in 2003. The number of tankers delivered reached 301 units in 2004 from 281 units in 2003. The average size was 91,700 dwt. Conversely, deliveries of bulk carriers were up by 2.7 million dwt, about 24.1 per cent, from the 2003 level. Another feature was the larger share of Panamax bulk carriers delivered in 2004, [Figure 3].

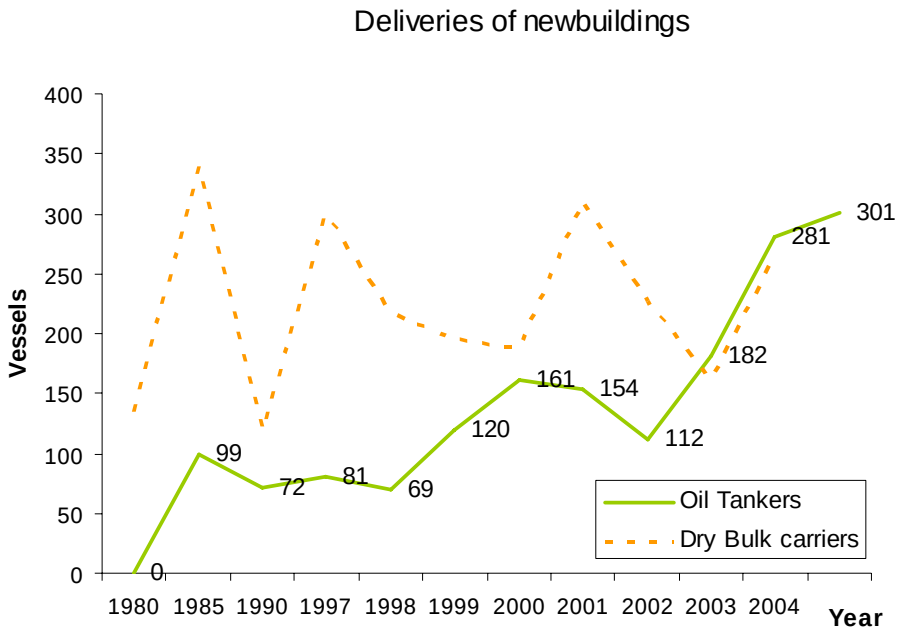

Figure 3: Deliveries of newbuildings, selected years
[*Source*: Based on data supplied by Fearnleys, Review]

3.3.3 Prices of newbuildings and second-hand tonnage

In 2004, prices for all the main types and sizes of newbuildings increased significantly over those of the previous year. Price increases were more pronounced for tankers and bulk carriers and reflected the high demand for these modes of transport. Newbuilding prices for VLCC tankers fared particularly well, with a 40 per cent increase in 2004, while prices for Suezmax tankers increased by 36.6. Price increases of 30.5 and 22.6 per cent were observed for LPG and LNG gas carriers. In general, the upward trend of shipbuilding prices during the year reflected increased ship ordering in the wake of optimistic forecasts for international trade.

Average second-hand prices for tankers and bulk carriers recorded substantial increases. Double-digit price increases were seen during the year, with Suezmax tonnage recording 54.2 per cent increases. A record number of transactions were reported for 2004, when 386 units changed hands (compared to 345 units the year before), with 244 units being over 50,000 dwt, including seven ULCCs.

Table 6: Second-hand prices for five-year-old vessels, 1999–2004

(as of year's end, in millions of dollars)

Vessel	1999	2000	2001	2002	2003	2004	% change 2003/2004
40,000 dwt tankers	20	27	26	24	28	40	42.9
80-95,000 dwt tankers[a]	26	39	33	30	38	57	50.0
130-150,000 dwt tankers[a]	36	50	43	42	48	74	54.2
250-280,000 dwt tankers[a]	50	71	60	53	75	107	42.7
45,000 dwt dry bulk carrier	16	15	12	15	21	30	42.9
70,000 dwt dry bulk carrier	17	16	14	17	28	41	46.4
150,000 dwt dry bulk carrier	28	25	22	26	41	57	39.0

Source: UNCTAD secretariat, 2005

a Prices correspond to the larger vessels in the range.

3.3.4 Scrap prices

Scrap prices are still very high compared to historical levels. Nevertheless, scrapping was lower than anticipated but should accelerate by the end of 2005 as single hull ships increasingly get out of favour.

3.3.5 Supply & Demand in world shipping

The normal relationship of supply and demand for crude oil and oil products has been severely disrupted. In response to the severe interruption in oil supplies in the U.S. Gulf of Mexico caused by hurricane Katrina and Rita that has led to loss of production and damage to refining and transportation infrastructure, member – nations of the International Energy Agency (IEA) and the U.S. made available to the market significant supplies from their strategic reserves. This situation will result in greater tanker demand than otherwise. Moreover, it could extend for a longer period except the seasonal factors reflecting in this way a rebuilding of the strategic reserves.

The IEA has projected daily oil demand at 85.2 mbpd for 2006 up 2.2 per cent from 83.4 mbpd for 2005. North America, China and developing Asian economies are forecast to absorb two-thirds of the forecasted supply. Every 1 mbpd increase in oil demand leads to approximately 8 to 10 million increase in dwt tanker capacity.

Additionally, expectations for the Chinese oil demand to rebound and the fact that the shipyards capacity is constrained until 2008 leads us to expect freight rates to pick up but at lower levels than in 2004. Barring major economic disruptions and assuming normal fuel requirements in the northern hemisphere, 2006 promises a fourth consecutive year of prosperity for the tanker industry.

3.3.6 Tanker freight rates

During 2004, tanker freight rates fluctuated in response to OPEC decisions to boost production levels, increased demand from major consumer countries and China, and buyers' decisions in an uncertain supply environment. In 2005, the demand for shipments of crude oil and oil products is likely to be affected by OPEC decisions related to production levels, by Russian export volumes, and by the strength of demand in Western Europe, North America, Japan and China.

Overall, the year 2004 was a very bright one for tanker owners. As Table 7 indicates, two of the five freight indices for vessels engaged in transporting crude oil and petroleum products rose during the year. The index for VLCCs and ULCCs went from 133 to 216 and that for clean tankers from 287 to 367.

The full extent of how good freight rates were during the year only becomes apparent, however, when one notes that all five indices had risen substantially in 2003 and that the three indices that fell during 2004 did so modestly. The indices for Suezmax, Aframax and handy-sized tankers dropped from 250 to 240, from 289 to 268 and from 386 to 378, respectively. In 2005 reduced rated for VLCCs and Aframaxes were fully offset by higher rates for the other vessel sizes. Estimates for 2006 are promising but significant lower than the 2004 freight rates, [Figure 4].

Table 7: Tanker freight indices, 2003 - 2005

(monthly figures)

	Lloyd's Shipping Economist					**Baltic Tanker**		**Lloyd's ship Manager**				
	>200	120-200	70-120	25-70	clean	Dirty Index	Clean Index	>150	70-150	30-70	<35	clean
2003												
October	59	119	160	197	194	963	838	58	120	153	202	180
November	117	151	201	239	219	1316	843	70	158	164	258	213
December	142	190	251	304	240	1576	992	125	279	333	290	243
Average 2003	106	153	204	247	218	1285	891	84	186	217	250	212
2004												
January	**133**	**250**	**289**	**386**	**287**	2121	1081	125	268	345	285	266
February	132	178	215	355	326	1982	1330	146	179	306	285	357
March	132	153	182	238	323	1380	1460					
April	96	141	188	204	260	1345	1033					
May	95	137	164	201	235	1129	908					
June	119	149	193	233	256	1476	1134					
July	127	156	187	243	240	1442	1110					
August	107	155	169	219	217	1484	1012					
September	103	154	163	229	226	1243	1033					
October	195	285	355	320	263	2081	1063					
November	276	342	374	433	390	2974	1780					
December	**216**	**240**	**268**	**378**	**367**	2689	1753					
Average 2004	144	195	229	287	283	1779	1225					
2005												
January	80	170	210	307	322	1812	1588					
February	135	165	181	233	267	1401	1303					
March	96	162	195	255	289	1587	1304					

Source: Executive summary in Lloyd's Shipping Economist, several issues; Baltic Tanker indices reported for the first working day of the month indices reported by Lloyd's Ship Manager (which were discontinued in March 2004)

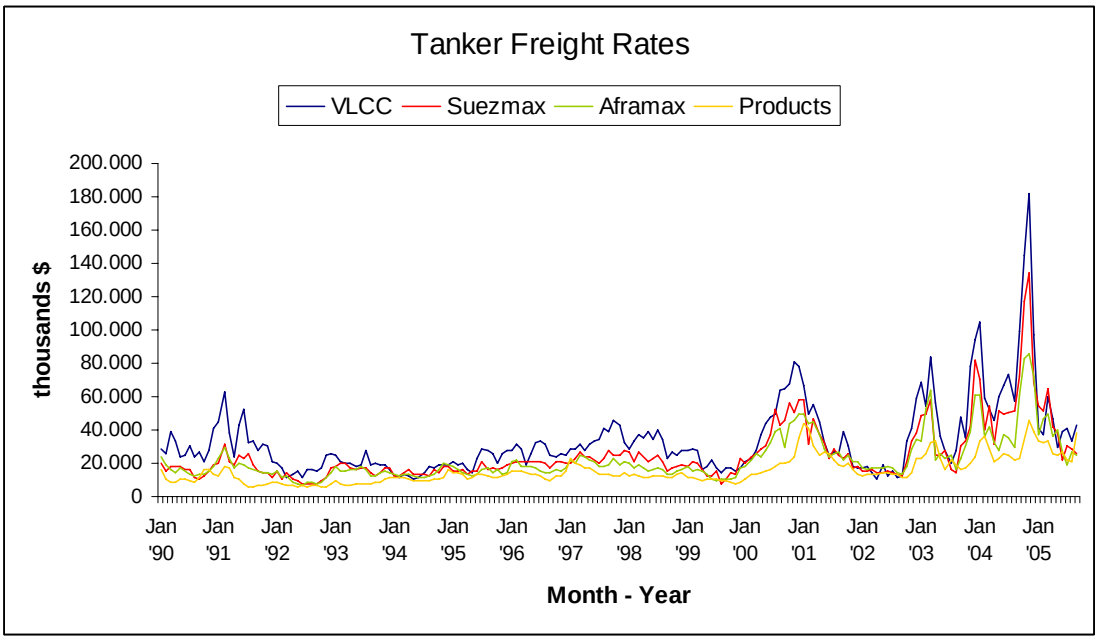

Figure 4: Tanker freight rates, 1990 -2005
[*Source*: Clarkson Research Studies, 2005]

4
SELECTED CASE

4.1 Tsakos Energy Navigation Ltd.

4.1.1 The Company

Tsakos Energy Navigation Limited[3] (TEN) is a leading provider of international seaborne crude oil and petroleum product transportation services. The company is based in Athens, Greece with associated offices around the globe. TEN owns a diversified fleet of modern tankers providing worldwide marine transportation for national, state and other independent international oil major companies and refineries[4] under long, medium and short-term charters. TEN's fleet is managed by Tsakos Group through Tsakos Shipping & Trading S.A., (TST), an affiliated group which is one of the largest independent ship-managers in the world[5], with 35 years management experience.

TEN owns, as of 29 April 2006 and operates a diversified fleet of 29 modern tankers comprising of 3.55 million dwt approximately, with an average age of 6.9 years, [Table 8] compared to the world's tanker tonnage average age of 11.5 years. TEN continues to aggressively broaden and expand its fleet and it is scheduled to take delivery of a further 13 newbuildings, until 2008, [Table 9]. The resulting fleet of 42 vessels with 4.5 million dwt approximately will include 33 purpose-built

[3] Public since 1993, Oslo Stock Exchange and the New York Stock Exchange under the ticker TNP since 2002, www.tenn.gr
[4] Several of the world's major oil companies, including Lyondell/Citgo, PDVSA, Exxon/Mobil, FLOPEC, Shell, Sunoco, PMI, Lukoil and Petrobas are among the regular customers of the Tsakos Group and of Tsakos Energy Navigation
[5] Based on the number of tankers under management

newbuildings vessels built in and delivered between the period 1998-2007 that will further strengthen TEN's position in the international energy arena. TEN has access to TST network seven offices around the globe and a pool of approximately of 2,500 seafarers, which is supported by Tsakos Shipping's sponsorship of two naval academies in the Philippines and a Tsakos Shipping manning office in Odessa, Ukraine.

The company focuses on owning and expanding a young, high-quality and diversified fleet[6]. The fleet diversity, which includes a number of sister ships, provide the opportunity to the company to be one of the most versatile operators in the market due to economies of scale and proximity considerations. TEN having identified the ice-class trades as a growing segment of the tanker industry commenced an ice-class heavy newbuilding program[7]. Currently, TEN is the largest owner of ice-class tankers and there is much evidence that this segment will be at premium freight rates during the next years. The upcoming phase-out of all single hull ships along with the increasingly stringent environmental regulations and heightened concerns about liability for oil pollution have contributed to a significant demand for the company's vessels, as TEN operates a 98% double hull fleet compared to a 67% of the world fleet in terms of dwt. Moreover, the company has on order one Liquefied Natural Gas (LNG) newbuilding vessel and exploring other opportunities in the LNG segment and the greater energy sector[8].

[6] Table 8: Tsakos Energy Navigation Fleet (*as of April 06*)
[7] Table 9: Tsakos Energy Navigation Newbuilding Program
[8] Floating Production, Storage and Offshore loading (FPSO) and Oil rigs

TEN enjoy the privileges of the Tsakos Group established industry recognition for over 35 years. The company's affiliation with Tsakos Energy Management (TEM) offers a significant leverage in maintaining low operating costs, efficiency, quality and safety. TEM oversees and subcontracts commercial management, day-to-day fleet technical management, such as crewing, chartering and vessel purchase and sales functions to TEN. The company maintains hull and machinery insurance through Argosy Insurance Company, Bermuda, a captive insurance company affiliated with Tsakos Group.

Historically, the company has employed a high percentage of its fleet on long and medium-term charters with fixed charter rates in order to maintain a measure of stability throughout industry cycles. Additionally, TEN maintains flexibility in its chartering policy, which allows capacity to take advantage of favourable current rate trends on the spot market and contracts of affreightment. Over the last five years, the fleet utilization rate was 97.5 per cent comparing to a 90 per cent rate of the average industry utilization.

Ten has adopted a poison pill in order to avoid separation from the larger Tsakos Group. Any takeover not approved by TEM would likely trigger a $60 million payment to TEM. Tsakos interests and insiders hold a significant portion of the equity, approximately 30 per cent.

4.1.2 The Management

Nikolas P. Tsakos - *President and Chief Executive Officer*

President, CEO and director since inception, he is also the sole shareholder of TEM. He has been involved in ship management since 1981 and has 36 months of seafaring experience. He is president of the Hellenic Marine Environment Protection Agency (HELMEPA), member of the council of the Independent Tanker Owners Association (INTERTANKO), a board member of the union of Greek ship owners (UGS), a council member of the board of the Greek shipping co-operation committee (GSCC) and a council member of the American Bureau of Shipping (ABS), Bureau Veritas (BV) and of the Greek committee of Det Norske Veritas (DNV). He serves as a member of the Board of Directors of Dryships Inc. He graduated from Columbia University in New York in 1985 with a degree in Economics and Political Science and obtained a masters degree in Shipping, Trade and Finance from the City University Business School in London in 1987. He served as an officer in the Hellenic Navy in 1988. He is 41 years old.

John D. Stavropoulos - *Chairman*

Mr. Stavropoulos served as Executive Vice President and Chief Credit Officer of The First National Bank of Chicago and its parent, First Chicago Corporation, before retiring in 1990 after 33 years with the bank. He chaired the bank's Credit Strategy Committee, Country Risk Management Council and Economic Council.

His memberships in professional societies have included Robert Morris Associates (national director), the Association of Reserve City Bankers and the Financial Analysts Federation. Mr. Stavropoulos was appointed by President George H.W. Bush to serve for life on the Presidential Credit Standards Advisory Committee. Mr. Stavropoulos was a director of Central Illinois Public Service Company, (CIPSCO) from 1979 to 1992, an instructor of Economics and Finance at Northwestern University from 1962 to 1968 serves as a life member on the Alumni Advisory Board of the Kellogg School of Management and is a Chartered Financial Analyst. He was elected to the Company's Board as its Chairman on June 1, 1994. Mr. Stavropoulos is a member of the Audit Committee.

Paul Durham – Chief Financial Officer

Mr. Durham joined the Tsakos Group in 1999 and has served as our Chief Financial Officer and Chief Accounting Officer since 2000. Mr. Durham is a United Kingdom Chartered Accountant. From 1989 through 1998, Mr. Durham was employed with the Latsis Group, shipping, refinery and banking enterprise, becoming Financial Director of Shipping in 1995. From 1983 to 1989, Mr. Durham was employed by RJR Nabisco Corporation, serving as audit manager for Europe, Asia and Africa until 1986 and then as financial controller of one of its United Kingdom food divisions. Mr. Durham worked with Ernst & Young (London and Paris) from 1972 to 1979 and Deloitte & Touche, (Chicago and Athens) from 1979 to 1983.

4.1.3 Historic Financial Analysis

The historic analysis is based on the recent six years Tsakos Energy Navigation financial statements dataset. According to this dataset TEN has a six year average historical growth rate of 25.3 per cent and Compound Annual Growth Rate, (CAGR) of 20.55 per cent, [Figure 5]. The main reasons for lower revenues were a smaller fleet of 26 vessels during 2005 compared to 27 vessels in 2004 supported by a lower utilization rate of 96.5 per cent versus 97.6 per cent in 2004. Lower charter rates for VLCCs and Aframaxes reflected the revenue reported for 2005. The historical average Gross Margin ratio is 55.3 per cent and the EBITDA Margin is 51.6 per cent. For 2005 year ending, the Operating Margin and Net Profit Margin ratios are 52.9 per cent and 54.7 per cent, respectively, well improved compared to 2004, [Figure 6]. Last year's Return on Invested Capital was 20.8 per cent (ROIC[9]), [Figure 7], and the Return on Equity (ROE) was 30.1 per cent, respectively.

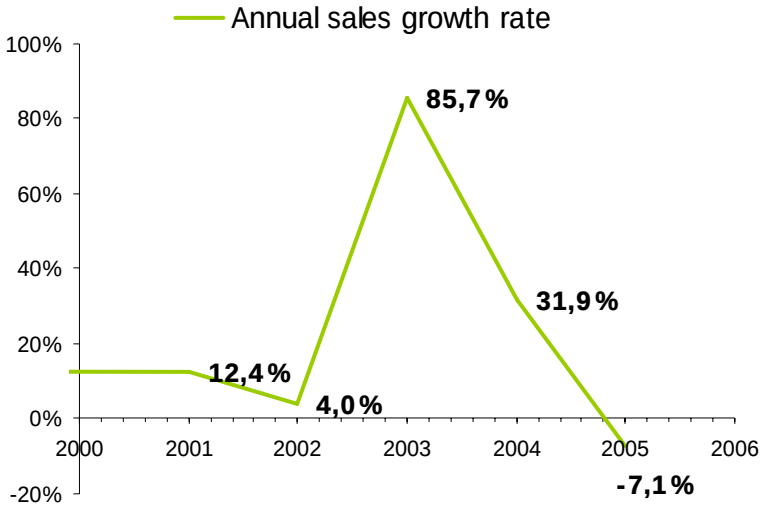

Figure 5: TEN; five recent year annual sales growth rate evolution
[*Source*: Based on data supplied by the company's annual financial reports]

[9] Based on NOPAT from ongoing operations, not NOPAT after extraordinary items

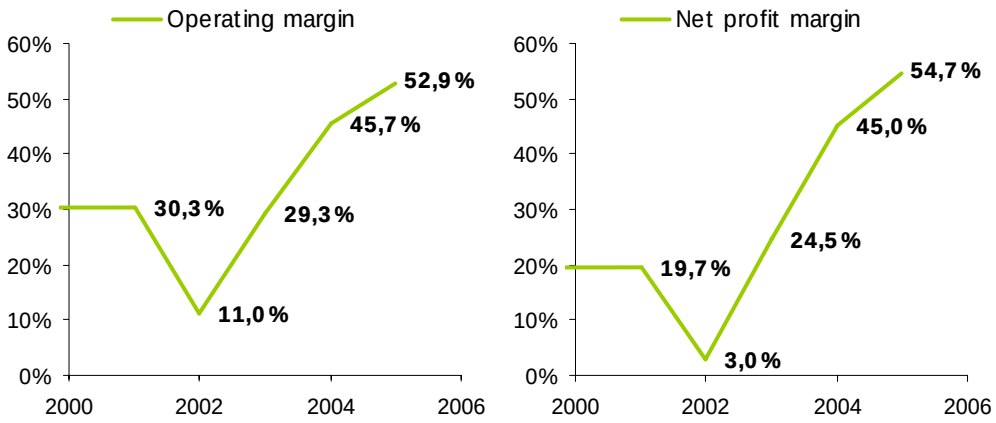

Figure 6: TEN; operating and net profit margins evolution
[*Source*: Based on data supplied by the company's annual financial reports]

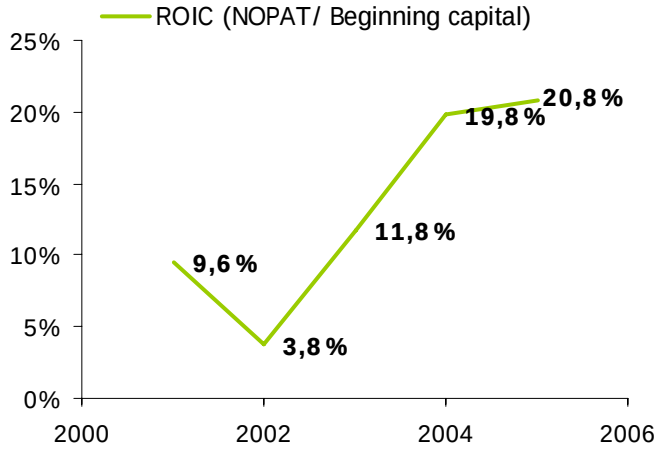

Figure 7: TEN; return on invested capital evolution
[*Source*: Based on data supplied by the company's annual financial reports]

Net income was $161.76 million for 2005 increased 12.89 per cent compared to the $143.29 million reported for 2004. Basic earnings per share based on average number of shares outstanding rose to $8.18 versus $7.53 in 2004.

The Cost of Goods Sold historical average is 44.7 per cent of sales and the trend is like to be decreased more on the following years, even though there are pressures especially from the increasing bunker fuel costs which mainly affect the voyage expenses, [Figure 8]. The Selling General & Administrative Expenses are not significant, as the company has no salaried employees and has engaged TEM to perform all other functions, financial, accounting and other back-office services. The SG&A account mainly include the management fees paid to TEM and other management incentive awards, [Figure 8]. These fees are compared favourably with management compensation and related costs by other publicly traded shipping companies. The depreciation to Net Vessels[10] ratio is 6.6 per cent on average. TEN has no physical assets except for its vessels and the newbuildings that are under contract. The depreciation method is straight line over 25 years as this is the industry standard.

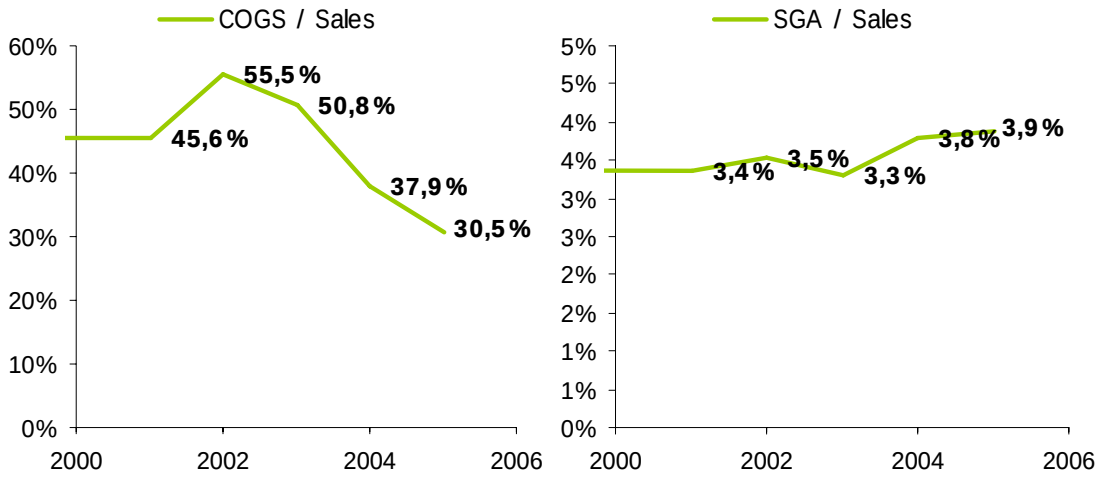

Figure 8: TEN; COGS and SG&A costs to sales evolution
[*Source*: Based on data supplied by the company's annual financial reports]

[10] Instead of Net Property Plant & Equipment or Net Assets

The cash-to-sales[11] historical average ratio is 37.4 per cent and it is stable during the analysis period securing the cash flow. The most recent cash-to-sales ratio was 49.2 per cent reflecting the cash that TEN collected from the vessel sales of $45.31 million in 2005 as compared with $21.37 million in 2004. TEN presents a strong balance sheet with net vessels book value of $711.36 million and a net vessels-to-sales ratio of 290.5 per cent on average, [Figure 9]. The total debt of the company is $433.519 million or 37 per cent net debt-to-total capital, approximately, leaving the company well positioned for future growth. The company does not have reserves for U.S. taxes. As long as 50 per cent of all stock continues to be owned by qualified individuals and companies than it will not be subject to U.S. federal tax. Qualified individuals are generally people residing in foreign countries and other entities not subject to U.S. taxing authority.

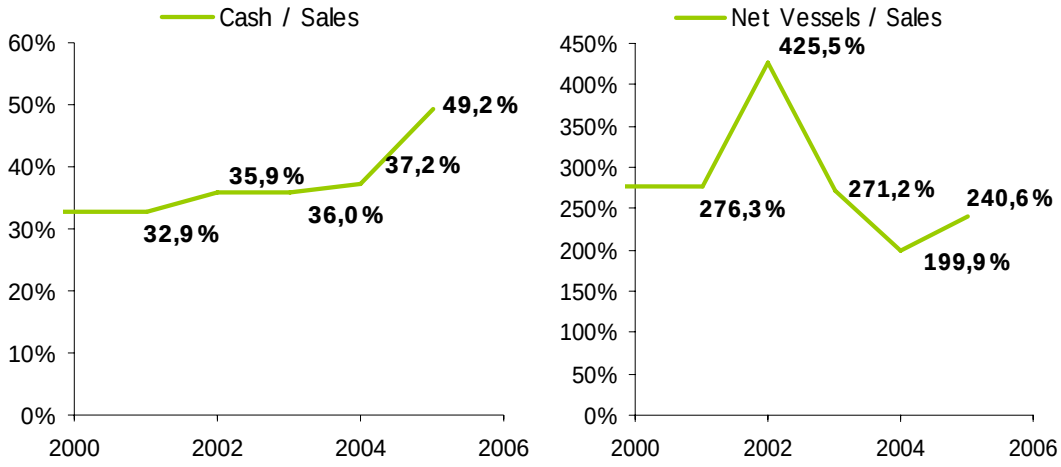

Figure 9: TEN; cash to sales & Net Vessels to sales ratios evolution
[*Source*: Based on data supplied by the company's annual financial reports]

[11] Cash includes the reported corporate cash from operations and gains from vessel sales, and cash equivalents

Notable positive comparison for 2005 versus 2004 was the much higher interest income, more than double and the gains from vessel sales of $45.31 million.

The evolution of the company's capital expenditure (CAPEX) as per cent of sales is illustrated on the following graph, [Figure 10].

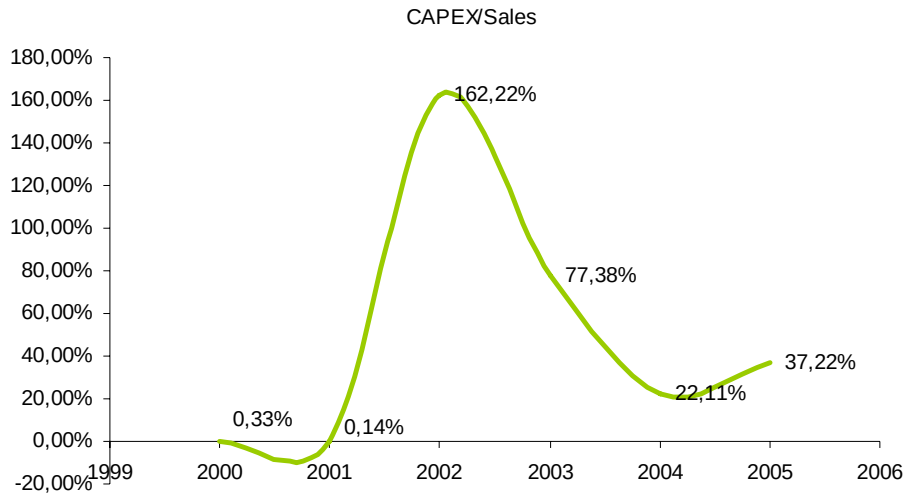

Figure 10: TEN; Capital Expenditure evolution as per cent of sales
[*Source*: Based on data supplied by the company's annual financial reports]

It is obvious from the figure above that TEN had predicted in time the upcoming boom of the freight rates during the 2003 to 2005 period and thus, it had invested heavily for its scheduled newbuildings program prior to 2003. TEN is still expecting to take delivery of an additional fleet of 21 vessels over the next two years. It seems that even if it continues to order new vessels it does that at a lower pace which reflects the lower current freight rates, the incapacity of the shipyards to fulfil new orders, and the oversupply of newer vessels from other operators in the tanker industry. For the future we can not estimate the exact rate of the company's capital expenditures as it is

something that would be related to the financial position of TEN and its ability to payback the past debts. It is the analyst opinion that it is more cost efficient for TEN to purchase contracts of newbuildings that are under construction instead of ordering new vessels directly to the shipyards especially if it has already arranged time charter agreements for the newbuildings. According to recent research TEN is planning to enter an agreement with major oil trader in order to purchase a fleet of 9 or more ships. This will make TEN one of the largest independent operators in the world.

Currently, the total weighted average number of shares outstanding is 19,772,270 million, after the recent repurchase program of 738,790 shares of common stock. The total market cap as of 19 April 2006 was 752,396,700 million dollars and the average trading volume for the last three months was 117,871 shares.

5 RATIONALE FOR MODEL

As it was mentioned above the model constructed for the financial analysis and valuation of the selected company was based upon the fundamental discount cash flow analysis. Cash flow discounting methods are based on the detailed, careful forecast, for each period, of each of the financial items related with the generation of the cash flows corresponding to the company's operations. In cash flow discounting-based valuation models, a suitable discount rate is determined for each type of cash flow. Determining the discount rate is one of the most important tasks and takes into account the risk, historical volatilities and several other factors. It is necessary to understand the assumptions for the prime and minor importance variables used in the model in order to use it effectively. The following factors have been taken in consideration by the analyst for the construction of the valuation model:

5.1.1 General economic and business conditions

The economic expansion in the U.S., Chinese and Indian economies, and the improved performance of the Japanese economy, with their impact on Pacific Rim and Latin American activity, produced a very strong demand for crude oils and its products during 2004 and 2005, [Figure 11]. The increase in demand for oil was also supported by seasonal factors and the need to restore depleted oil inventories in the U.S. mainly caused by the hurricanes Katrina and Rita, and other major Organization for Economic Cooperation and Development, (OECD) importing countries.

However, if the production of and demand for crude oil and petroleum products slows in the future, a corresponding decrease in shipments of these products could have an impact on the employment of Tsakos Energy Navigation Ltd., [TEN] vessels and the charter rates that they command. In particular, the charter rates that TEN earn from spot charters, contracts of affreightment and vessels employed in pools may decline. In addition, overbuilding of tankers has, in the past, led to a decline in charter rates. If the supply of tanker capacity increases and the demand for tanker capacity does not, the charter rates paid for TEN vessels could materially decline. The resulting decline in revenues could have a material adverse effect on TEN revenues and profitability.

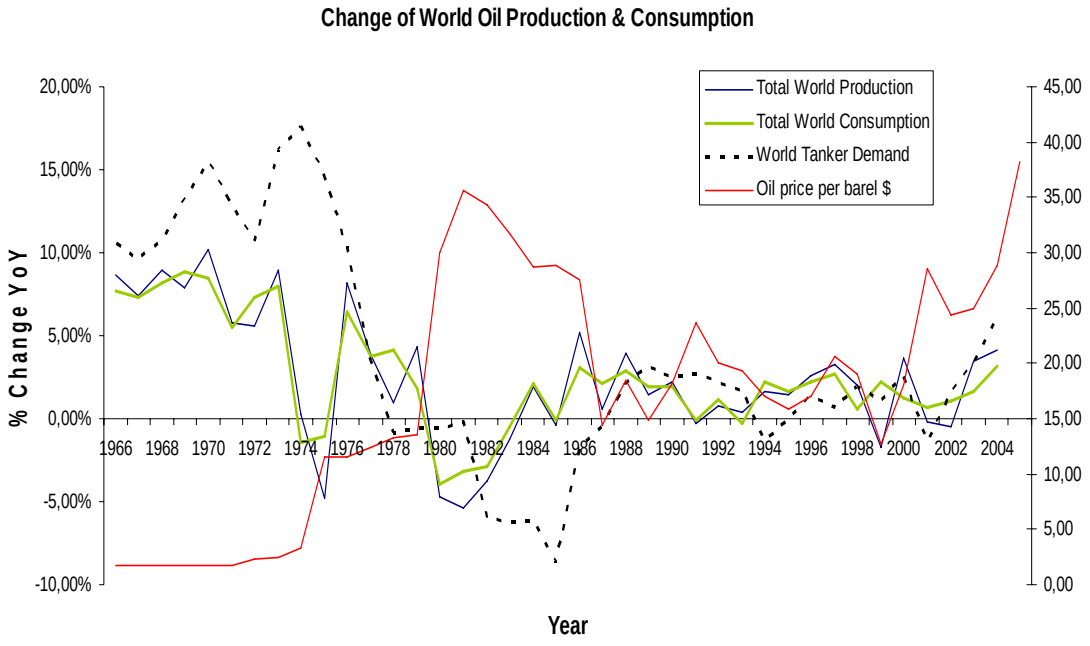

Figure 11: Change of world oil production – consumption & tanker demand
[Source: Based on Data supplied by the BP Statistical Review of World Energy, 2005 & Clarkson Research Studies, 2005]

5.1.2 Availability of and demand for crude oil & petroleum products

Any decision or action taken by the OPEC member – nations, major oil producers and the rest of the oil exporting countries as well any unforeseen event in the refineries would result in imbalance between supply and demand for crude oil and petroleum products affecting this way the performance of the tanker industry, [Figure 12].

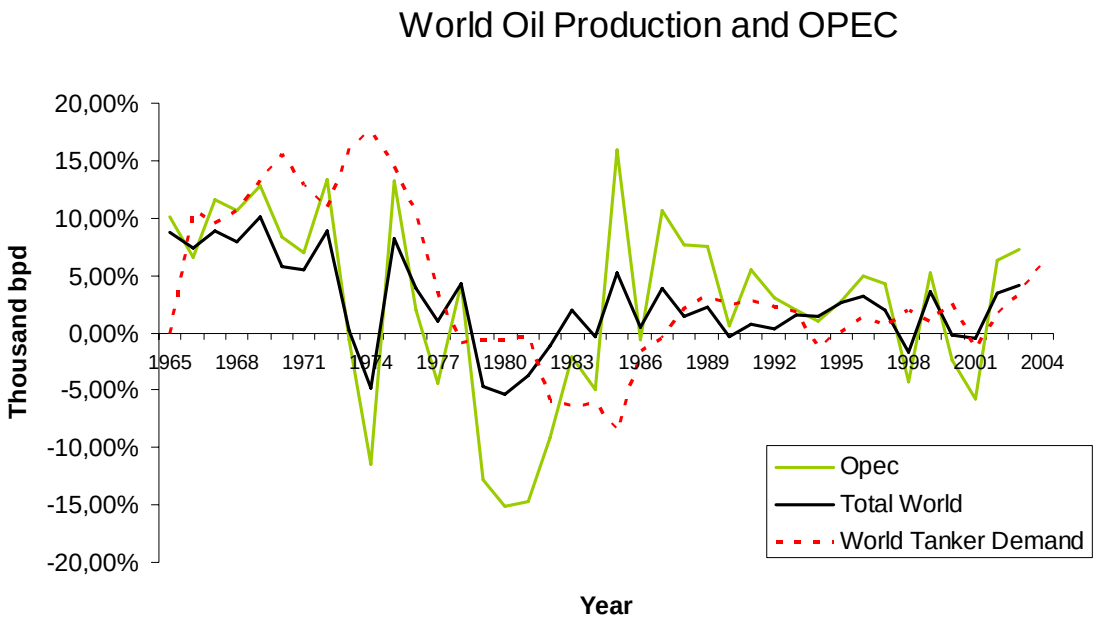

Figure 12: World oil & OPEC production evolution
[*Source*: Based on data supplied by BP Statistical Review of World Energy, 2005 and Clarkson Research Studies, 2005]

5.1.3 Demand for crude oil and petroleum product substitutes

Demand for crude oil and petroleum product substitutes such as natural gas, coal, hydroelectric power and other alternate sources of energy that may among others things, be affected by environmental regulation, [Figures 13][Figure 14] are related

negatively to the tanker industry's profitability. To address these developments, TEN intend to expand and further renew its fleet by pursuing the acquisition or construction of additional vessels or fleets that are complementary to its existing ones, assuming TEN has the financial resources and debt capacity to do so. In addition, TEN is exploring opportunities in the liquefied natural gas (LNG) market to expand its exposure in the overall energy sector. However, the world's tanker and LNG shipyards have little or no additional capacity until the end of 2008 and the company may not be able to purchase or construct additional vessels, other than those currently on order, on commercially acceptable terms. If TEN seek to expand through the acquisition of other tanker or LNG companies, the company face numerous challenges.

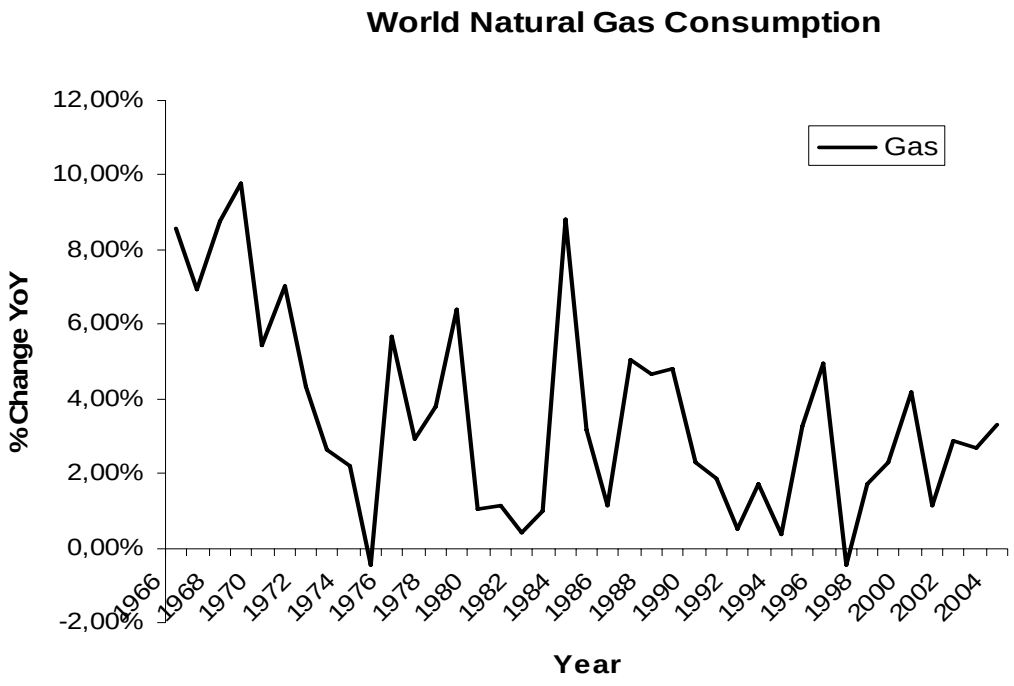

Figure 13: World natural gas consumption
[*Source*: BP Statistical Review of World Energy, 2005]

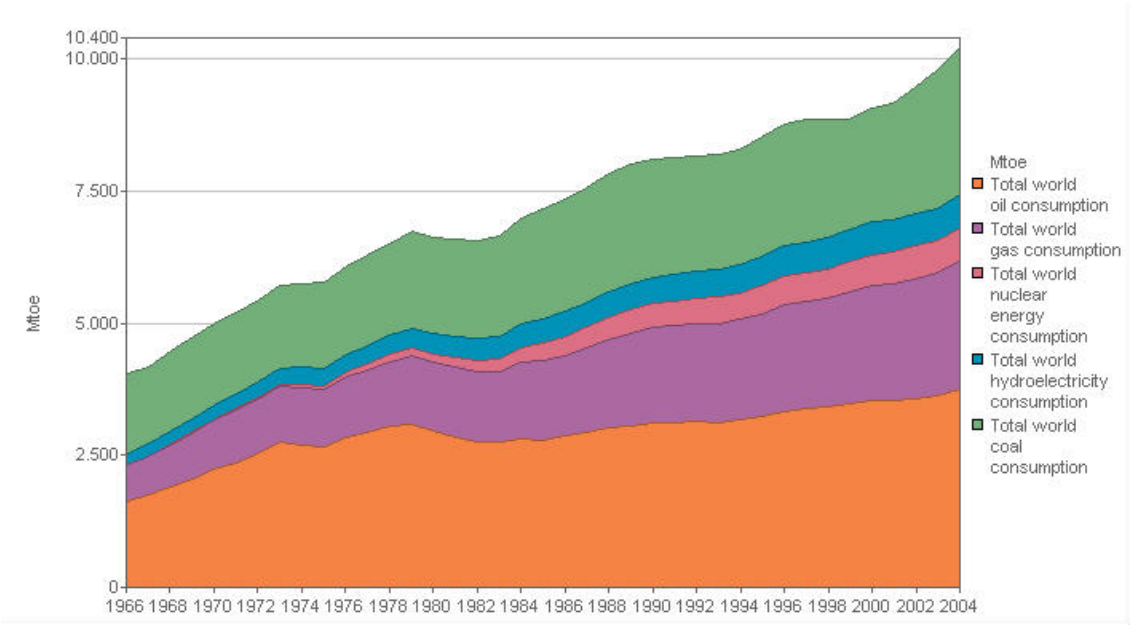

Figure 14: **World demand for oil, gas, nuclear energy, hydroelectricity & coal**
[*Source*: BP Statistical Review of World Energy, 2005]

5.1.4 Competition in the marine transportation industry

Competition in the tanker industry is intense and depends on price, location, size, age, condition, and the acceptability of the available tankers and their operators to potential charterers. The selectivity of the potential charterers would affect the ability of the company to find new charters for its vessels. The spot market for crude oil and petroleum product tankers is highly competitive. In 2004, TEN derived approximately 37 per cent of its revenues from time charters, as compared to 36 per cent in 2003. As the current period charters of TEN vessels expire, it may not be possible to re-charter these vessels on a period basis at attractive rates. Currently, TEN announced that 76 per cent of 2006 employable days have been already booked or are under contract. Charter rates are subject to significant fluctuations, and tankers may experience substantial off-hire time. If attractive period charter opportunities are not available, the company would seek to charter its vessels on the spot market.

As a result of any increased reliance on the spot market, TEN may experience a lower utilization of its fleet, leading to a decline in operating revenue. At the same time, this reliance to the spot market would affect the operating costs. Specifically, the voyage expenses will be more impacted by increases in the cost of bunkers. Unlike time charters in which the charterer bears all of the bunker costs, in spot market voyages the company incurs the bunker charges as part of the voyage costs. For 2006 the expense environment will be challenging but TEN is well positioned to compete as a low cost operator.

5.1.5 Tanker supply and demand

Tanker supply is increased by shipbuilding and decreased by scrapping in the long run. Overcapacity would affect the profitability of the company through lower freight rates and oversupply of services. According to a recent report from the Clarkson Research Studies, currently the rate of the tanker deliveries is significantly higher than the demolition rate, [Figure 15]. Estimates suggest that this situation will be reversed during the following years because of the single – hull phase out policy and the high scrap prices offered. On the tanker demand side according to the same report, forecasts suggest growth of 12 million dwt a year until 2010.

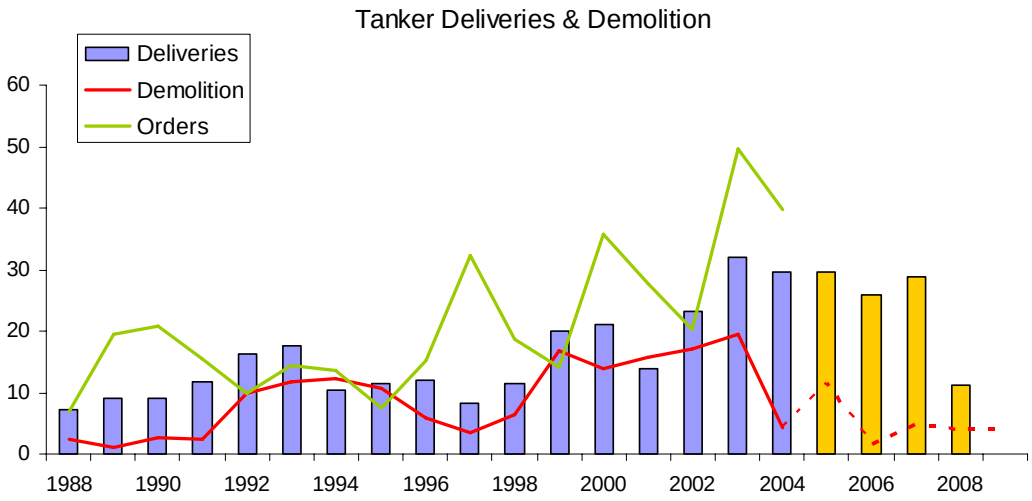

Figure 15: Tanker deliveries and demolition, real data and estimates
[*Source*: Clarkson Research Studies, 2005]

5.1.6 Other factors

Developments in international trade; the growing importance of China, India, Latin Americas and the rest of the Association of South East Asian Nations (ASEAN) affect the world demand for oil imports and thus, marine transportations. Changes in seaborne and other transportation patterns; any action to construct or reactivate pipelines for exporting crude oil that might affect the marine transportations would harm the tanker industry. Some of the pipelines have a direct relation with the tanker demand by removing or reducing the length of the tanker voyage. Acts of terrorism and other hostilities that can affect the tanker industry; after the events of the 11th of September 2001 any potential threat to the safe marine transportation of crude oil and other petroleum products would affect the tanker industry irreversibly.

6 MODEL CALCULATIONS

In order to calculate the corporate value of Tsakos Energy Navigation, we use the discounted cash flow valuation model. The starting point is the net operating profit after taxes, (NOPAT).

6.1 NOPAT Calculation

We can define NOPAT as:

$$NOPAT = Operating\ \Pr ofit * (1 - Tax\ Rate)$$

6.2 Operating Capital Calculation

The operating capital consists of two components, short-term and long-term. The short-term component is called net operating working capital, (NOWC).

Net operating working capital is defined as:

$$NOWC = Operating\ \ Current\ \ Assets - Operating\ \ Current\ \ Liabilitie\ s$$

The long-term operating capital is defined as total operating capital:

$$Total\ Operating\ \ Capital\ = Net\ Operating\ \ Working\ \ Capital\ + Net\ Vessels$$ [12]

[12] Instead of Net Property Plant & Equipment

6.3 Calculation of the Future Expected Free Cash Flow

Free cash flow, (FCF) is the amount of cash available for distribution to all of the firm's investors. In calculating FCF, we begin with the firm's operations, which include the activities associated with the company's vessels, equipment, crew, and managers.

$$FCF = NOPAT - Net\ Investment\ in\ total\ operating\ capital$$

$$V_{op} = \sum_{t=1}^{\infty} \frac{FCF_t}{(1+WACC)^t} = \frac{FCF_1}{WACC - g} = \frac{FCF_0(1+g)}{WACC - g}$$

The above expression $\sum_{t=1}^{\infty} \frac{FCF_t}{(1+WACC)^t}$ means to take the sum of $\frac{FCF_t}{(1+WACC)^t}$ for t starting at *1* and continuing forever:

$$\frac{FCF_1}{(1+WACC)^1} + \frac{FCF_2}{(1+WACC)^2} + \frac{FCF_3}{(1+WACC)^3} + \ldots + \frac{FCF_t}{(1+WACC)^t} \text{ where } t=\infty$$

Even though this formula does not explicitly include all the future free cash flows, it does in fact equal the present value of all the future free cash flows.

6.4 Estimating the Weighted Average Cost of Capital

6.4.1 Estimating the Values of the Financing Components

To calculate the WACC we estimate the target percentages of the firm that we think will be financed in the future with long-term debt (w_{LTD}), short-term debt (w_{STD}), preferred stock (w_P) and common stock (w_S).

The reformulated version of TEN balance sheets for the year ending on date showed that TEN had $415.863 million in long-term debt including short-term debt and current portion of long-term debt which was reported as $17.656 million. It also showed that TEN has $730 million in total common equity. The balance sheet also showed no preferred stock.

We are usually willing to use the reported book values for long-term debt, short-term debt, and preferred stock as estimates of their market values.

The percentage of TEN that is currently financed with long-term debt (w_{LTD}) is:

$$(w_{LTD}) = \frac{LT\ debt}{LT\ debt + ST\ debt + \Pr eferred\ Stock + Common\ Equity}$$, or 36.69 per cent

According to the 2005 financial report the company expects the target ratio to be 45 per cent through 2007.

The percentage of TEN that is currently financed with short-term debt (W_{STD}) is:

$$(w_{STD}) = \frac{ST\ debt}{LT\ debt + ST\ debt + \Pr eferred\ Stock + Common\ Equity}$$, or 1.5 per cent

TEN currently has no preferred stock, so we assume that its target future capital structure will also have no preferred stock.

$$(w_{PS}) = \frac{\Pr eferred\ Stock}{LT\ debt + ST\ debt + \Pr eferred\ Stock + Common\ Equity}$$, or 0 per cent

We always use an estimate of the current market value of equity, also known as market capitalization, or just market cap. TEN has about 19,772,270 million shares outstanding and a stock price of $36.84, as of 29 April 2006. Thus, its market value of common equity is $730.389 million, approximately.

$w_S = 1.0 - (w_{LTD} + w_{STD} + w_{PS})$, or 61.82 per cent

Estimating the Cost of Long Term Debt

The cost of long term debt was estimated at 4.76%. Our estimate is based on the following formula: $r_{LTD} = r_{RF} + spread$

Estimating the Cost of Common Equity

The company's regressed beta was calculated as:

$$\beta = \frac{Co\,\text{var}\,iance(r_M, r_i)}{Variance(r_M)}$$ or 0.987.

According to the Capital Asset Pricing Model, (CAPM) we assume that the risk –free rate is equal to the U.S. treasury securities bill. In our case we use a ten year constant maturity market yield, 4.56%. For the market risk premium we assumed a 7% rate. The calculation for the regressed beta is based on the average rate of return of the S&P 500 index.

According to the CAPM the cost of equity formula is:

$r_s = r_{RF} + beta * (r_M - r_{RF})$, or 11.47 per cent

6.4.2 The Weighted Average Cost of Capital Calculation

In order to calculate the target capital structure we use the weighted average cost of capital formula:

$WACC = w_s r_s + w_{LTD}(1-T)r_{LTD} + w_{STD}(1-T)r_{STD} + w_{PS} r_{PS}$, or 8.86 per cent

6.4.3 Intrinsic Value

In order to end up with the intrinsic value per share for TEN first we have to calculate the horizon value of the company operations using the constant growth model. In our case we assumed zero growth at horizon.

$$V_{op} = \frac{FCF_{t+1}}{WACC - g} = \frac{FCF_t * (1+g)}{WACC - g}$$

Finally, after the following calculations we can forecast the intrinsic value of TEN's stock.

	Value of Operations
add	the Value of Non-operating Assets
equals	the Total Value of the corporation
subtract	the Value of Debt
equals	the Value of Equity
divide	by number of shares
equals	price per share

7
FORECASTS

The simplified version of the valuation model returned an implied stock price of $58.41. With the current trading price of $38.38 as on Friday, April 28, 2006, TEN currently trades at a discount 65.71 per cent to its intrinsic value. The sophisticated version of the valuation model returned an implied price of $64.67 or a discount of 59.35 per cent to its intrinsic value.

Both versions of the discounted cash flow model are as accurate as the assumptions underlying it. In particular, according to the current trends industry, the analyst believe that the tanker industry is on the peak of the market cycle and predicts that the company's revenues will gradually decrease with a long term growth rate of zero per cent.

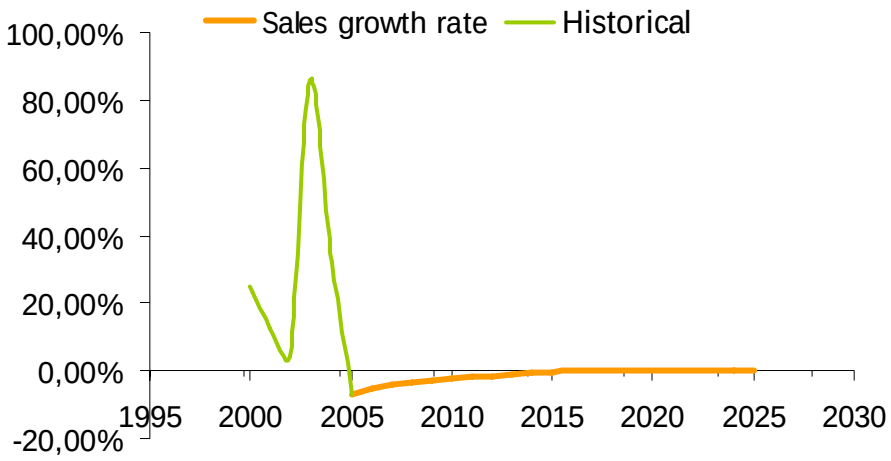

Figure 16: TEN; Sales growth forecast

The main reason for the revenue decrease is the shipbuilding effect which will push the freight rates at lower levels. TEN would be moderate affected as its strategy of employing its fleet on time charter contracts secure the cash flow generation. However, the analyst believes that TEN will be able to generate positive earnings but not at its past all time high records. An expanded fleet of more than 51 vessels according to the current fleet under operation and the newbuildings will permit TEN to seek higher utilization rates for the next two years and provide its clients a wider pool of vessels to choose from. Moreover, TEN will be able to enjoy the premiums of a modern and diversified fleet and the positive cost effects from its affiliation with Tsakos Group. According to the market analysts the industry environment is quite optimistic for the next 3 years when a recession might follow the recent boom or a new wave similar to the 2003 will drive the tanker industry further.

8
VULNERABILITIES

One of the variables that was impossible to integrate into the valuation model was the gain or loss on sale of vessels. Currently, TEN took advantage of the high prices in the second hand market and reported gains on the sale of vessels in years 2004 and 2005. In fact this item for the company's operations was the main reason for the reported record earnings per share. In particular, the company realized gains of $45.3 million in 2005. The company continues its newbuilding program and planning to expand the fleet aggressively for the next three years. Meanwhile, a productive sale and purchase strategy is an integral aspect of a successful shipping operation; it would be a mistake to forecast the company's decisions in selling vessels in the second hand market or expand its order book. Moreover, TEN can sell the vessels or the newbuildings contracts in order to keep the cash on the balance sheet and then buy at a discount in the forthcoming recession.

The company's revenue will be affected mainly by the factors that were analyzed in the previous sections. As the oil demand is still growing, emphasis is given to the shipbuilding effect that affects the freight rates and the tanker demand, and the company's strategy to employ the fleet in the long-term charter or the spot market. However the analyst expects TEN to benefit from the balanced charter strategy. Expansion of operations in the ice class and LNG segments is considered to be the seeds for secure growth in the future. Additionally, the analyst believes that there is a great possibility for an acquisition in the LNG segment.

9
SUMMARY & CONCLUSIONS

In such a competitive environment TEN is able to realize record profits for more than three consecutive years increasing the shareholder value and is well positioned for future growth. The premiums that currently the company enjoys are not sustainable in the long-term by default. The pressures for a correction are building up.

The industry is expected to consolidate more. Until 2008 the general environment is favourable but the company need to mind for the higher vessel operating costs and maintain the same utilization rates for its expanding fleet. The fact that the company operates a high quality and diversified fleet with half the average age of the industry is an important advantage. Future growth in the industry depends on the performance of the Chinese market and the rest of the developing countries in South-East Asia. For TEN future growth seems to be more related to the oil exports from Russia and the rest of the countries that serve the ice class segment. It is pleonasm but we have to highlight once more the volatility and cyclicality that characterizes the tanker industry especially after the recent unpredictable results.

The valuation model that has been developed for this thesis purposes is useful for discounted cash flow valuation. It is a good base for better modelling in the future. However, tanker industry is affected from many exogenous factors and key parameters that are interrelated with each other and is not simple to formulate separately the relationship between two factors or more.

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APPENDICES

APPENDIX A: GLOSSARY OF TERMS

ABS	American Bureau of Shipping
Aframax	Vessel too large to pass through the Panama Canal, 100,000dwt, approximately
ASEAN	Association of South East Asian Nations
Bcm	Billion cubic metres
BV	Bureau Veritas
CAGR	Compound Annual Growth Rate
CNG	Compressed Natural Gas
DNV	Det Norske Veritas
Dwt	Deadweight tons
EU	European Union
GDF	Gaz de France
GSCC	Greek Shipping Co-operation Committee
Handymax	Vessel 40,000dwt, approximately
HELMEPA	Hellenic Marine Environment Protection Agency
IEA	International Energy Agency
IMO	International Maritime Organization
INTERTANKO	Independent Tanker Owners Association
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
Mbpd	Million barrels per day
OECD	Organization for Economic Co-operation and Development
OPEC	Organization of the Petroleum Exporting Countries
Panamax	Vessel with the maximum dimensions for passing the Panama Canal 70,000dwt, approximately
SEC	Securities and Exchange Commission
Suezmax	Vessel with the maximum dimensions for passing the Suez Canal 150,000dwt approximately
TEM	Tsakos Energy Management
TEN	Tsakos Energy Navigation Ltd.
TEU	20-foot Equivalent Unit
TST	Tsakos Shipping & Trading S.A.
UGS	Union of Greek Ship owners
ULCC	Ultra Large Crude Carrier
UNCTAD	United Nations Conference on Trade and Development
VLCC	Very Large Crude Carrier 300,000dwt, approximately
WTO	World Trade Organization

Table 8: Tsakos energy navigation fleet as of February 2006

Vessel	Year Built	Year Acquired	Hull Type	Deadweight Tons	Charter Type	Expiration Of Charter
VLCC						
Millennium	1998	1998	Double-hull	301.171	bare boat	September 2013
La Madrina	1994	2004	Double-hull	299.700	spot (USG)	$95.000pd
La Prudencia	1993	2006	Double-hull	298.900	spot (USG)	
SUEZMAX						
Archangel	2006	2006	Ice 1A Class Double Hull	162.400	spot (USG)	$67.650pd
Alaska	2006	2006	Ice 1A Class Double Hull	162.400	spot	$67.650pd
Silia T	2002	2002	Double-hull	164.286	time charter	September 2006
Cape Baker*	2002	2002	Double-hull	164.274	time charter	September 2006
Cape Balboa*	2002	2002	Double-hull	164.236	time charter	October 2006
Triathlon	2002	2002	Double-hull	164.445	time charter	January 2011
Euroniki	2005	2005	1C Ice Class Double Hull	164.608	time charter	
Eurochampion 2004	2005	2005	1C Ice Class Double Hull	164.608	spot (USG)	$67.650pd
AFRAMAX						
Parthenon	2003	2003	Double-hull	107.018	contract of affreightment	Evergreen
Marathon	2003	2003	Double-hull	107.181	spot (USG)	
Opal Queen	2001	2002	Double-hull	107.181	time charter	October 2007
Olympia*	1999	1999	Double-hull	107.181	spot (Med)	
Maria Tsakos	1998	1998	Double-hull	107.181	spot (Med)	$120.000pd
Athens 2004	1998	1998	Double-hull	107.181	contract of affreightment	Evergreen
Vergina II	1991	1996	Single-hull	96.709	time charter	April 2006
PANAMAX						
Andes	2003	2003	Double-hull	68.439	pool	Evergreen
Maya	2003	2003	Double-hull	68.439	time charter	August 2005
Inca	2003	2003	Double-hull	68.439	time charter	May 2006
Aztec	2003	2003	Double-hull	68.439	pool	December 2005
Victory III	1990	1996	Double-hull	68.160	pool	
Hesnes	1990	1996	Double-hull	68.157	pool	Evergreen
Bregen	1989	1995	Double-hull	68.157	pool	Evergreen
HANDYMAX / HANDYSIZE						
Didimon	2005	2005	Double-hull	37.432	pool	
Libra	1988	1994	Double-sided	41.161	spot	
Crux	1987	1995	Double-sided	41.161	time charter	November 2005
Delphi	2004	2006	Double-hull	37.432	time charter	September 2006
Total Vessels	**29**		**Total dwt**	**3.548.644**		

*Sale & Leaseback

Source: Based on data supplied by Tsakos Energy Navigation Ltd. Annual Reports

Table 9: Tsakos energy navigation newbuilding program

	Expected Delivery	Hull Type (all double-hull)	Deadweight Tons	Ship Yard	Purchase Price in $US millions
SUEZMAX					
Arctic	February 2007	Ice 1A	162.400	Hyundai Heavy Industries	57,40
Antarctic	April 2007	Ice 1A	162.400	Hyundai Heavy Industries	57,40
AFRAMAX					
Hull S-1328	March 2007	DNA design Aframax	105.000	Sumitomo Heavy Industries	47,30
Hull S-1334	June 2007	DNA design Aframax	105.000	Sumitomo Heavy Industries	58,60
TBN	November 2008	DNA design Aframax	105.000	Sumitomo Heavy Industries	58,90
TBN	November 2008	DNA design Aframax	105.000	Sumitomo Heavy Industries	58,90
HANDYSIZE					
Antares	June 2006	Ice 1A Product/Chemical Tanker	36.660	Hyundai MIPO	30,00
Arion	October 2006	Ice 1A Product/Chemical Tanker	36.660	Hyundai MIPO	30,00
Andromeda	March 2007	Ice 1A Product/Chemical Tanker	36.660	Hyundai MIPO	30,00
Aegeas	May 2007	Ice 1A Product/Chemical Tanker	36.660	Hyundai MIPO	30,00
Byzantion	May 2007	Ice 1B Product/Chemical Tanker	37.340	Hyundai MIPO	44,00
Bosporus	September 2007	Ice 1B Product/Chemical Tanker	37.340	Hyundai MIPO	44,00
LNG					
Hull S-1754	January 2007	Mebrane	150.000cm^3	Hyundai Heavy Industries	173,50
	Total.		966.120		720,00

Source: Tsakos Energy Navigation Ltd. Annual Reports

Table 10: The 35 most important maritime countries and territories as of 1 January 2005

County of domicile	Number of vessels			Deadweight tonnage				
	National Flag	Foreign Flag	**Total**	National Flag	Foreign Flag	**Total**	Foreign Flag as % of total	**Total as % of world total**
Greece	739	2 245	2 984	50 997	104 147	155 144	67.13	18.48
Japan	717	2 228	2 945	12 611	105 050	117 662	89.28	14.01
Germany	349	2 266	2 615	9 033	48 877	57 911	84.40	6.90
China	1 695	917	2 612	27 110	29 703	56 812	52.28	6.77
United States	624	1 009	1 633	10 301	36 038	46 338	77.77	5.52
Norway	768	821	1 589	14 344	29 645	43 989	67.39	5.24
Hong Kong (China)	274	331	605	17 246	23 747	40 993	57.93	4.88
Republic of Korea	567	372	939	10 371	16 887	27 258	61.95	3.25
United Kingdom	426	459	885	10 865	14 978	25 843	57.96	3.08
Taiwan Province of China	112	419	531	5 297	18 034	23 331	77.30	2.78
Singapore	443	297	740	12 424	9 909	22 333	44.37	2.66
Denmark	300	346	646	8 376	8 491	16 867	50.34	2.01
Russian Federation	1 721	362	2 083	6 845	8 405	15 250	55.11	1.82
Italy	530	136	666	9 360	4 086	13 446	30.39	1.60
India	353	33	386	11 729	981	12 709	7.72	1.51
Switzerland	17	307	324	792	10 681	11 474	93.10	1.37
Saudi Arabia	53	70	123	872	10 190	11 062	92.12	1.32
Malaysia	259	68	327	6 054	3 781	9 835	38.44	1.17
Iran, Islamic Republic of	159	13	172	9 011	467	9 478	4.93	1.13
Turkey	423	225	648	6 196	2 572	8 768	29.33	1.04
Belgium	56	122	178	4 429	3 695	8 124	45.48	0.97
Netherlands	519	186	705	4 358	2 540	6 897	36.82	0.82
France	161	114	275	2 318	4 376	6 694	65.37	0.80
Canada	216	109	325	2 535	3 445	5 979	57.61	0.71
Indonesia	554	118	672	3 660	2 094	5 754	36.39	0.69
Brazil	137	14	151	2 955	2 470	5 425	45.54	0.65
Sweden	159	163	322	1 530	3 889	5 419	71.77	0.65
Philippines	287	39	326	3 952	1 057	5 008	21.10	0.60
Spain	88	231	319	248	4 115	4 363	94.32	0.52
Kuwait	36	9	45	3 487	304	3 791	8.02	0.45
Cyprus	22	54	76	459	2 643	3 102	85.19	0.37
Thailand	261	36	297	2 583	399	2 982	13.38	0.36
Ukraine	259	134	393	1 002	1 677	2 679	62.61	0.32
United Arab Emirates	0	134	134	0	2 658	2 658	100.00	0.32
Australia	44	41	85	1 350	1 294	2 644	48.95	0.31
Total (35 countries)	13 328	14 428	27 756	274 697	523 326	798 022	65.58	95.04
World total	15 251	15 846	31 097	293 139	546 494	839 633	65.09	100.00

Source: Compiled by the UNCTAD secretariat on the basis of data supplied by Lloyd's Register – Fairplay.

Figure 17: Global marine industry segmentation, by volume

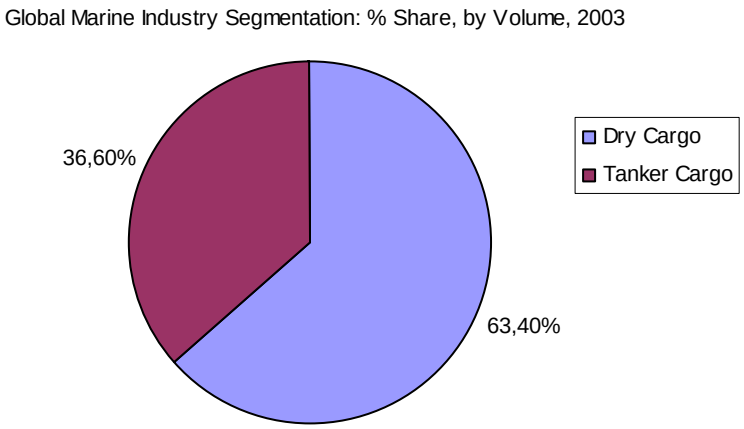

Figure 18: Global marine industry segmentation, by value

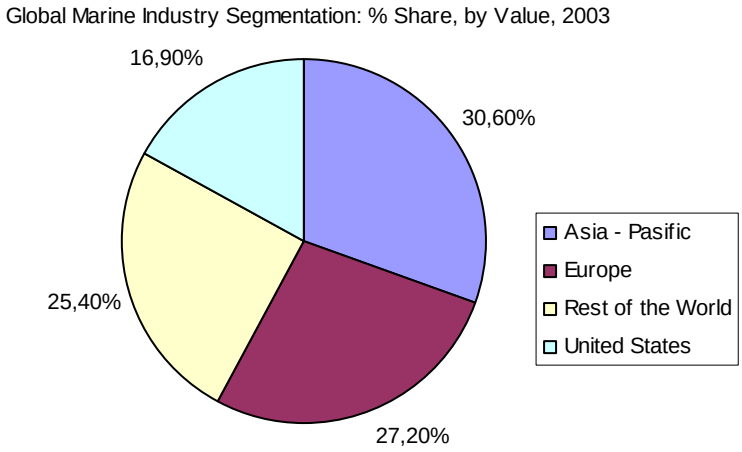

Figure 19: TEN; worldwide vessel operations