

Benchmarking of Operational Key Performance Indicators for OMV Austria Exploration & Production GmbH

Master Thesis
by
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handed in to
the Department of Business Administration
at the
Mining University of Leoben
Leoben, August 2008

I declare in lieu of oath, that I wrote this thesis and performed the associated research myself, using only literature cited in this volume.

(Eugen Längauer)

Leoben, August 2008

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List of Abbreviations

BBL	Barrel of Oil (= 158.987 Litres)
BBL/YR	Barrels of Oil per Year
BOE	Barrel of Oil Equivalent (1 STB = 6000 CF)
BOE/D	Barrels of Oil Equivalent per Day
BOE/YR	Barrels of Oil Equivalent per Year
CAPEX	Capital Expenditures
CEE	Central Eastern Europe
CF	Cubic Feet
E&P	Exploration and Production
EBIT	Earnings before Interest and Taxes
EOR	Enhanced Oil Recovery
EVA	Economic Value Added
IFRS	International Financial Reporting Standards
LNG	Liquefied Natural Gas
MMBOE	Million Barrel of Oil Equivalent
MN	Million
MVA	Market Value Added
NGL	Natural Gas Liquid
ROACE	Return on Average Capital Employed
ROI	Return on Investment
USD	US Dollar
USGAAP	United States Generally Accepted Accounting Principles
WTI	West Texas Intermediate
YR	Year

Glossary

Average Capital Employed The Capital Employed at the beginning of a year plus the net capital at the end of the year divided by 2 to gain the average

Finding Costs Total exploration expenses divided by change in proved reserves (extensions, discoveries and revisions of previous estimates)

NOPAT Net Operating Profit after Taxes; profit on ordinary activities after taxes plus net interest on net borrowings and interest on pensions, less extraordinary result plus/minus tax effect of adjustments

Production Costs Cost of material and personnel during production excluding royalties

Proved Oil and Gas Reserves

Proved oil and gas reserves are the estimated quantities of crude oil, natural gas, or natural gas liquids which geological and engineering data demonstrate with reasonable certainty to be recoverable in the future from known reservoirs under existing economic and operating conditions

Proved developed Oil and Gas Reserves

Proved developed oil and gas reserves, those can be expected to be recovered through existing wells with existing equipment and operating methods

Proved undeveloped Oil and Gas Reserves

Proved undeveloped oil and gas reserves, those are expected to be recovered from new wells on un-drilled acreage, or from existing wells with high investments in the re-completion

ROACE

Return on Average Capital Employed; NOPAT divided by average capital employed expressed as a percentage

Unproved Oil and Gas Reserves

Unproved oil and gas reserves of crude oil and natural gas are the estimated quantities at a specific date, which analysis of geological and engineering data, indicates might be economically recoverable from already discovered deposits, with a sufficient degree of probability.

1 Introduction

1.1 Objective of the Study

The international market of the exploration and production business of the petroleum industry is becoming more and more competitive, because of decreasing crude oil and natural gas reserves, a higher consumption of fossil energy in China, India and the United States, a higher rivalry between the exploration and production (E&P) companies and national petroleum companies, and an increasing “Petro-Nationalism” in countries like Venezuela, Iran or Russia. These lead to more and more strategic alliances and acquisitions of the world wide operating E&P companies or to a concentration of their resources into niches. Under these conditions it became more important to operate efficiently to obtain profitability, success, and to hold the strategic position or to profit higher from own strengths.¹

In the last few years the OMV Group turned from a small Central-European oil company to a worldwide operational E&P company. It also became a bigger player in the European exploration and production sector, with a leading position in the Middle and Eastern Europe area. OMV’s strategies of the last years were very successful and the value and size of OMV Austria Exploration & Production grew to the most efficient and profitable petroleum exploration and production unit in Central and Eastern Europe, but it is not known if this premise to be the most efficient and profitable company is right.

This thesis in hand tries to verify this statement with the help of a strategic controlling tool. In this case, a benchmarking-study compares performance indicators that are able to prove or to disprove the leading position of OMV Austria compared to its Peer’s in Central Eastern Europe and in the E&P sector.

1.2 Structure of the Thesis

The thesis consists of four main parts. The theoretical fundamentals are the first part, which are necessary to understand the objective and target of this thesis. The second part describes the analysis of the companies. The third part is dedicated to the benchmarking-study and finally the fourth part is reserved for the conclusion and recommendations.

The first part of this thesis brings an introduction to the theoretical fundamentals, which will be the basis for the subsequent parts of the thesis. The theory gives an insight to the strategic controlling in general, which tools are available, their definitions, descriptions, and meanings and the importance of performance indicators. After the introduction, the strategic controlling tool benchmarking will be described in detail.

The second part of this thesis is the descriptive analysis that is the first part of the benchmarking-process. This part deals with the economical development of the defined performance indicators during the defined period. It also includes an analysis why the performance indicators developed the way they did (see chapter 3).

¹ see Konzelmann (2006), p. 14f

The third part is dedicated to the benchmarking-process itself. This chapter tries to answer the question after the company with the best practice or the most success and relates it to the OMV Austria.

The OMV Austria is benchmarked first with its competitors in the CEE countries followed by a benchmark with the members of the E&P Peer Group (see chapter 4 and 5).

The fourth and last part of this thesis contains the conclusions of the previous parts and some recommendations about them.

2 Theoretical Fundamentals

This part of the thesis deals with the theoretical fundamentals that are necessary for the understanding of the practical part. During this chapter, the topics strategic controlling and performance indicators will be generally discussed. The topic benchmarking, which is an instrument of the strategic controlling, will be subsequently discussed in detail. Each of the topics will be generally explained, and applied in the practical part.

2.1 Strategic Controlling

“If you know the enemy and know yourself, you need not fear the result of a hundred battles. If you know yourself but not the enemy, for every victory gained you will also suffer a defeat. If you know neither the enemy nor yourself, you will succumb in every battle.”

Sun Tzu (The Art of War, 500-320(?) B.C.)²

This quote of the Chinese author Sun Tzu is a good description of the terminus “strategy”. In the past, the term strategy was always meant in a military context, like in books of Caesar, Macchiavelli, and Clausewitz but the importance of a strategy to be successful is also true for businesses.

A suitable definition of “strategy” for the science of industrial management is “the way to realise a business goal”. This means that a strategy gives a rough orientation to reach an aimed business target with sequences of steps. Strategies should be always updated and flexible to the changing business environment, like changes in the behaviour of the competitors, to remain successful.³

For a long-term and sustainable business success, two positions are important:

- The knowledge of the own abilities (“...know yourself”)
- The knowledge of the own environment (“...know the enemy”)

One possibility to reach the target of being or staying successful is to introduce controlling into the company or business. Controlling is an interdivisional tool that helps the management to direct and to guide a company or business. It supports the management with relevant information that are necessary for decisions, and that are necessary to coordinate the planning- and control-units. This includes also the acquisition, processing, and handling of information. Controlling also includes quantitative, non-monetary, and qualitative information because of their possible relevance of decisions.⁴

Important is not to confuse knowledge, information and data. There are several definitions for all three words, but for this thesis, “knowledge” is defined as “specific information about something” or “the sum or range of what has been perceived, discovered, or learned”.

“Information” is “a collection of facts or data” and “data” are “factual information, especially information organized for analysis or used to reason or make decisions”.⁵

² see Tzu (500-320 BC), p. 9

³ see Baum/Coenenberg/Günther (2004), p. 1

⁴ see Baum/Coenenberg/Günther (2004), p. 4f

⁵ see American Heritage Publishing Company, 2003

Following figure shows the strategic controlling as self-regulating process that supports the strategic planning successfully (see Fig. 1).

The strategic controlling consists of many single components from the vision and strategic targets to the development and implementation of strategies.⁶

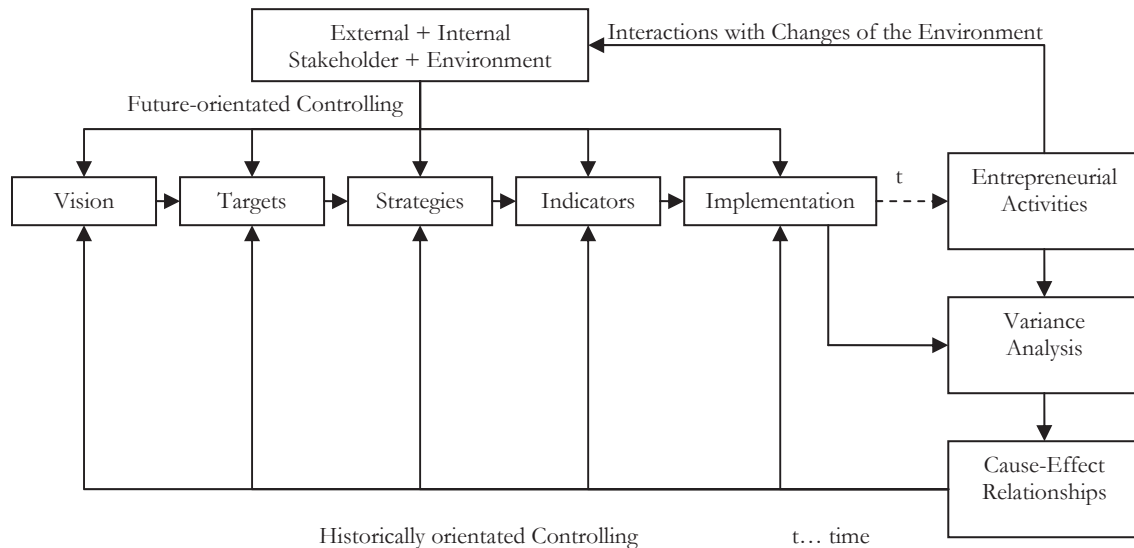


Fig. 1: Process of the Strategic Controlling⁷

The strategic controlling is not only a variance-analysis of the aimed target. A main task is also the observation of changes of the internal and external stakeholders of the company. The high importance is the validation of the measures of the strategic planning, because if strategic targets are not reached or reached with a delay, it is possible that success potentials or even the whole business, are endangered. If there are variances related to the planned values, it is necessary to inquire the causes. These variances can be internal or external. External variances could be a political change, changes of the market, or changes of the competition. A reaction to these changes would be an adaptation of the strategic plan, or the establishing of a task force. Internal variances can occur if the management is weak or the strategic incentives do not energize. Possible reactions on internal variances are also an adaptation of the strategic plan, or the exchange of the management. The future-oriented controlling must be able to reach the targets with the formulated strategy with a sufficient probability.⁸

In general, controlling covers four core areas, which are independent of their field of application:

- Planning
- Checking
- Information
- Coordination

⁶ adopted from Kohlöffel (2000), p. 189

⁷ adopted from Harrison/John (1994), p. 10

⁸ see Kohlöffel (2000), p. 189f

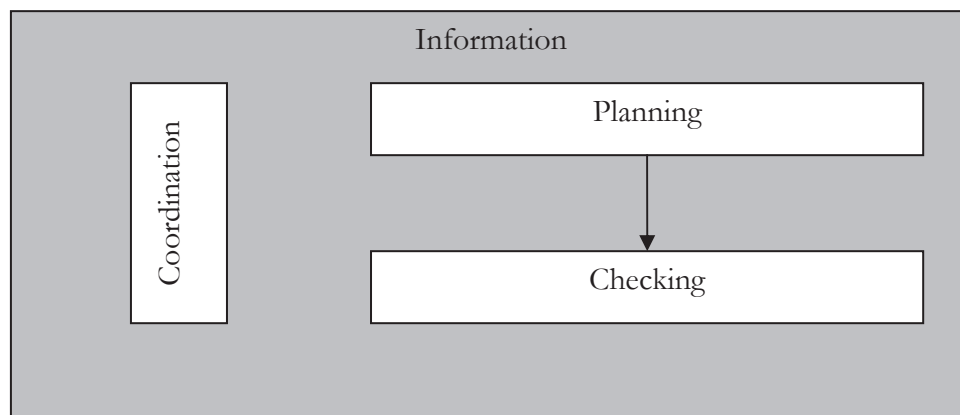


Fig. 2: Controlling-Tasks⁹

Fig. 2 shows the interactions of the four core areas of controlling.

In general, planning is a future-orientated and corporation-wide system of control. It is very rational and coordinates the different divisions and functions of a company. Planning should help to reach the optimal decisions for the business objectives. The planning-system becomes a mediatory tool between the business objectives and of the decisions of the lower management.

A task of the controlling is to ensure that all the relevant information is available and to define the grade of information needed by the management. Such sources of information can be internal, like the accounting, or external like economical data banks.

The controlling has also the task of coordination. A decision in a functional area has consequences in others and therefore it is necessary to coordinate the planning overlapping over all departments. To reach this coordinate it is necessary to support all departments with the relevant information.

To reach this high targets, instruments were developed to help the management and the controller to improve and to implement the strategic controlling within a company or business.¹⁰

2.1.1 Tools of Strategic Controlling

To be successful with strategic controlling some tools were developed within the years. They show different accesses to the topic and are listed and discussed below:¹¹

- Strategic Planning (5 years and more)
- Strength-Weakness Analysis
- GAP Analysis
- SWOT Analysis
- Life Cycle Analysis
- Portfolio Analysis
- Balanced Scorecard

⁹ adopted from Preißner (1999), p. 3

¹⁰ see Preißner (1999), p. 4f

¹¹ see Baum/Coenenberg/Günther (2004), p. 5ff

- Benchmarking
- Six Sigma

Strategic Planning

“Strategy” is defined as a long-term concept that needs to be continuously checked. The main function of a strategy is to reach a given target.

“Planning” is a targeting activity that is done by several persons or teams to prepare different possibilities for decisions. It is rational and coordinates the different departments and functions of the company to reach the corporate goal.

The main task of the strategic business planning is to ensure the effectiveness of a company, it is used for the risk assessment, and it is a mediator between the business targets and the decisions at the lowest business level. If there is a closed controlling system, the comparison of the planning and the actual-results can show the lacks of a plan, and the improvement for the future.¹²

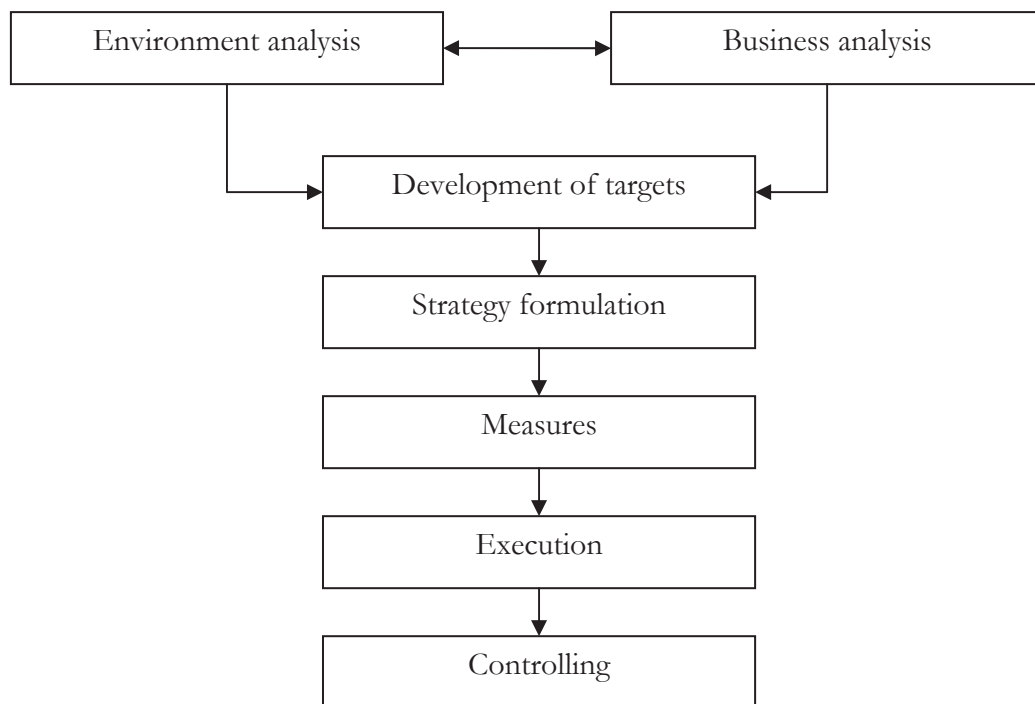


Fig. 3: Elements of the Strategic Business Planning¹³

The environmental analysis consists of the analysis of the legal, political, economic, technical, sociological, and ecological conditions. The business analysis deals with the strengths and weaknesses of a company. The development of targets is a part of the company’s philosophy, and is used for the employee’s identification with the company. Selected portfolios, like the SWOT-analysis, define the strategy formulation. The measures are strategic options that are used to follow the strategy. During the execution, the earlier defined measures are put into action.¹⁴

¹² see Preißner (1999), p. 9

¹³ adopted from Kreikebaum (1997), p. 62

¹⁴ see Kreikebaum (1997), p. 62ff

The Strength-Weakness Analysis

An entrepreneur uses the strength-weakness-analysis to find possible potentials and resources that are not used, or that are not used correctly. These potential can be group-, functional- or value-oriented. This analysis is always a comparison with the environment of a company.

There are three possible methods: comparison over time, comparison with competitors, and the comparison of critical success factors.

The strength-weakness-analysis has advantages and disadvantages. An advantage is that, the entrepreneur gets an overview about the enterprise and the positions of comparison. But the entrepreneur sees only certain parts of the enterprise and gets no general view. The subjective assessment of the resources may lead to unrealistic interpretations.¹⁵

The GAP Analysis

The gap-analysis is a classical tool of the strategic controlling and is used to find deviations of the target path that are undesired. It shows possible problems and unwanted developments and is a so called “early detection method”. This analysis delivers empirical results that justify and explain the introduction of strategic controlling (see Fig. 4).

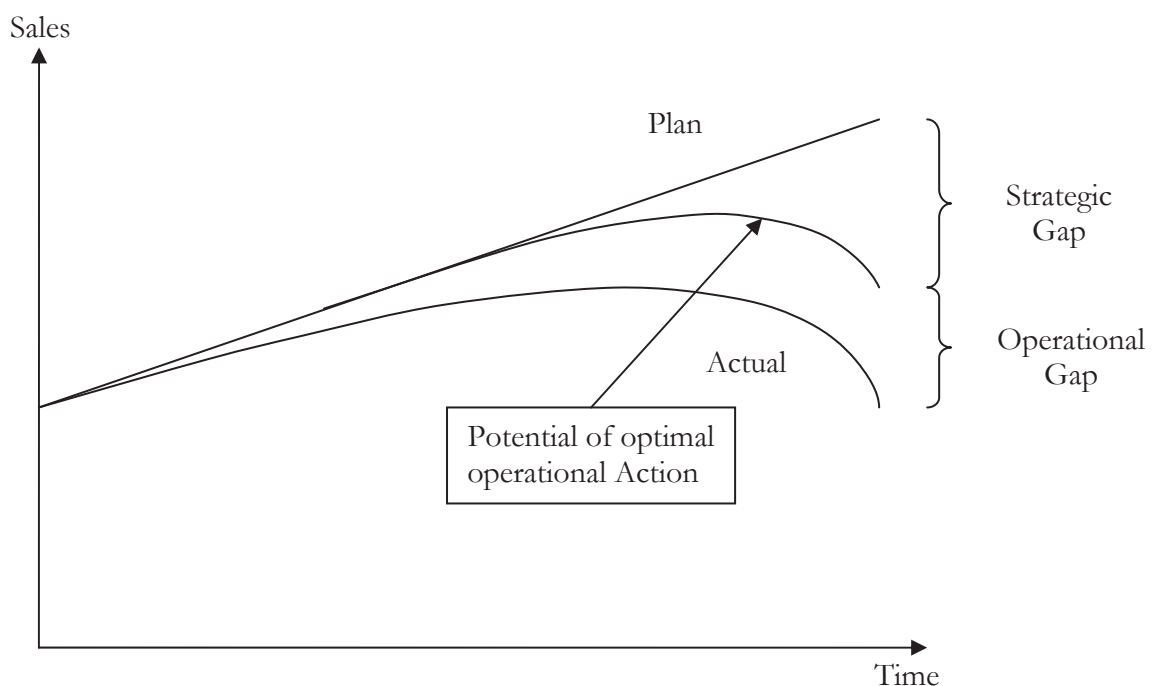


Fig. 4: A graphical Representation of the GAP-Analysis¹⁶

A reason for the introduction of strategic controlling was that the long-term targets like profit- or revenue-targets of a company could not be reached by time. The real development (Actual) was always behind the target (Plan). This difference between the ‘Plan‘ and the ‘Actual‘ opened a gap. For the closure of this gap it is possible to introduce short-time measures like better logistics, reduction of costs, or better harmonizing of

¹⁵ see Baum/Coenenberg/Günther (2004), p. 70f

¹⁶ adopted from Kreikebaum (1997), p. 134

operational sub-plans (operational gap) but it is also necessary to change given corporate structures, like obsolete production programs or obsolete manufacturing processes, to reach a long-term improvement (strategic gap).¹⁷

Advantages of this tool:¹⁸

- A first step raster of analysis
- Opportunity to find the strategic gap

Disadvantages of this tool:

- No assessment
- No recommendations for actions
- No consideration of environmental dynamics

The SWOT Analysis

The SWOT-analysis is a tool to analyse the current situation in a company and is used to find possible future strategies. SWOT means Strengths – Weaknesses – Opportunities – Threats. If these terms are put together in pairs, they form four possible strategies:¹⁹

- SO-strategies: use the internal strengths to realise external chances. An ideal would be if profits from existing business units could be used for expansion. To make the best out of this strategy it is necessary to become offensive.
- ST-strategies: use the internal strengths to reduce external threats. For example if a company acquires a competitor to use the new advantage of size to improve competitiveness. This strategy should lead to an adoption to restore its strengths.
- WO-strategies: are used to minimize internal weaknesses or to build up missing strength to pursue possible opportunities. An example is the technical cooperation between two competitors to develop a new technology. It is better to stay defensive and to observe the competitors.
- WT-strategies: are used to reduce internal weaknesses and to avoid external threats. An implementation of a business reengineering project may help to improve the cost position and, in the same time, to work against a price collapse to ensure the survival of the company.

With the analysis of the development of strengths and weaknesses, a good strategy should be found. A company will only be successful if its strategies are oriented on its strengths, weaknesses, opportunities, and threats.

¹⁷ see Baum, Coenenberg, Günther (2004), p. 17f

¹⁸ see Schneider (2007), p. 148ff

¹⁹ see Kohlöffel (2000), p. 156

SWOT - Analysis		Internal Analysis	
		Strengths	Weaknesses
External Analysis	Opportunities	SO: use strengths => take chances	WO: defuse weaknesses => take chances
	Threats	ST: use strengths => prevent threats	WT: defuse weaknesses => prevent threats

Tab. 1: The SWOT - Analysis Matrix²⁰

The value of this analysis lies in the logical connection between the analysis of the environment and the company as an elementary basis for further developing strategies.

The Lifecycle Analysis

The lifecycle analysis is an analysis to estimate a company's products. It consists of different phases of the lifetime of a product, of markets, or of technologies (see Fig. 5). With the knowledge of such a lifecycle, it is possible to define the product's position and to derive strategic measures. The result should be the answer of the question, if the company has the "right" products related to their technical quality and if the products are in the right markets.²¹

1. Introduction:
 - Product introduction => customer decides about the demand
 - High unit costs
 - End of this phase = break even
2. Growth
 - Cash flow and profits increase
 - End of this phase => highest profits
3. Maturity
 - New competitors with lower prices enter the market
 - Reduction of prices to stay competitive
 - Interest of customer decreases
4. Decline
 - Profits decrease
 - Market saturation is reached
 - Decision to give up the product

²⁰ see Schneider (2007), p. 159

²¹ see Probst (2000), p. 98f

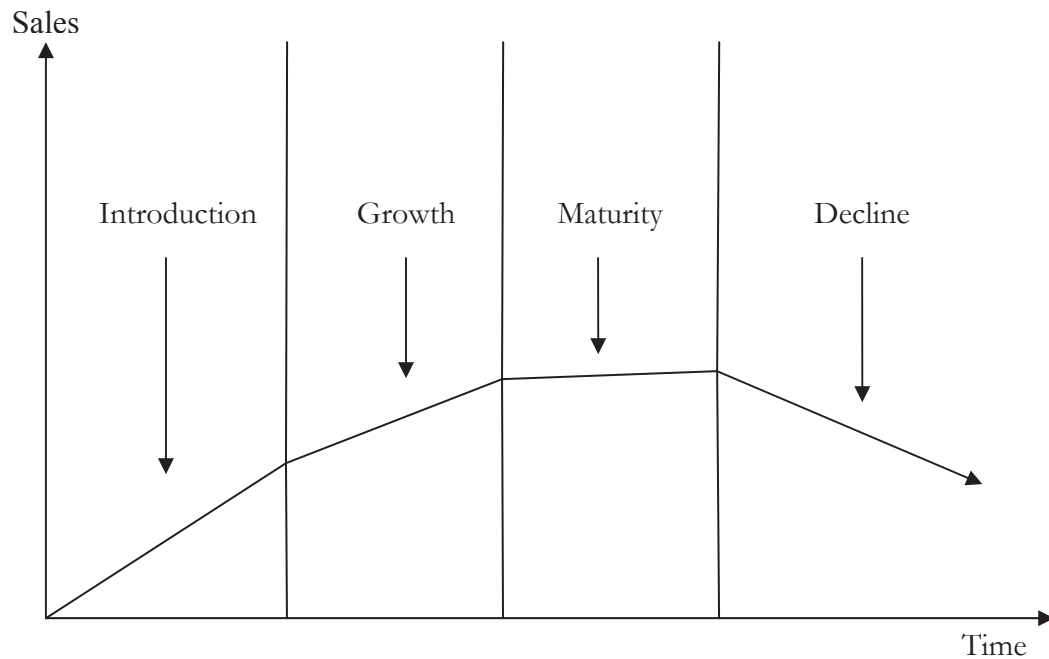


Fig. 5: Product Lifecycle Curve²²

For the operative and strategic planning of a product it is useful to know the lifecycle of the own products, of the market and of the products of the competitors. It may be useful to start with a new product if other products are in decline, because the development and implementation of new products is expensive. To know the product lifecycle of the competitors enables the possibility to bring in new products on time. The trend nowadays is a shortening of the product lifecycle so that the companies have less time to gain their profits.²³

To summarize, the product life cycle enables to look at the sales, the profitability, and the cash flow.²⁴

The Portfolio Analysis

The portfolio analysis is a method to estimate a company's product and it is a possibility to analyse all business units concerning their balance. The term 'product' represents also the terms business units, services, products and every other output a company is possible to deliver.

There are two important targets:

1. A balanced structure of the business units
2. A balance between defensive and high risk business units

In other words, the target of the portfolio analysis is to realise an advantageous mixture of different product-market-areas to secure the company's existence.²⁵

²² adopted from Preißner (1999), p. 25

²³ see Baum/Coenenberg/Günther (2004), p. 83ff

²⁴ see Baum/Coenenberg/Günther (2004), p. 72

²⁵ see Baum/Coenenberg/Günther (2004), p. 73

The basis, for this analysis is the environmental-analysis and the analysis of the company. There are many types of portfolio analysis, but the two most important ones are the market-share and market-growth portfolio (four-field-matrix) (see Tab. 2), and the market-attractiveness and the competitive-strength portfolio (nine-field-matrix).²⁶

Market Growth	High	Question Marks	Stars
	Low	Poor Dogs	Cash Cows
		Low	High
		Relative Market Share	

Tab. 2: Four-Field-Matrix of the Portfolio Analysis²⁷

In a four-field-matrix the relative market-share is the relation between the own market-share and the market-share of the strongest competitor. The market-growth represents the environment (see Tab. 2).

Products that are integrated in growing markets but do have a small relative market share are the “Question Marks”. These products are in the introducing- and growth-phase of their lifecycle and they still need a lot of investment.

Products that are successful in their growing phase become “Stars” and they have a dominant market-share, a high market-growth, and a positive cash flow.

If the rate of growth sinks below ten percent per year, the “Stars” become “Cash Cow” products. They are now in their maturity- and decline-phase, are still market leaders and bring a high cash flow.

“Poor Dogs” are products that only have a small market-share in a slowly growing or stagnant market. No investments are taken for these products and they will disappear from the market.

Out of the portfolio, four strategies are possible.

A ‘strategy of investment’ for the “Question Marks” would be favourable to reach a better position in the market to turn the product into a “Star”, which means the product has the possibility of a high growth but a low market share. This is a strategy of high risk and of high investments. If this strategy fails, it is necessary to disinvest immediately to invest in other products or markets.

It is recommended to use a ‘strategy of growth’ to consolidate the market-position and to defend the market-leadership. The cash flow is low or negative during this phase and still high investments are necessary because of the continuous growth of the market. Another target is to hold the relative cost benefits.

The ‘absorption strategy’ is applied during the maturity phase of a product (“Cash Cow”), and uses the surplus on earnings for investments in other business units and tries to hold the market-share. Low investments are necessary and an expansion of capacities take place. This strategy delivers the cash flow for “Stars” and “Question Marks”.

²⁶ see Simon/von der Gathen (2002), p. 35

²⁷ adopted from Probst (2000), p. 100

A 'strategy of disinvest' is useful if the markets only grow slow or they stagnate and the cash flow decreases like at the "Poor Dogs". This strategy is done during the phase of degeneration of the product.²⁸

Advantages of this tool:²⁹

- Comparison of different companies is possible
- Strategies are readable
- A high value of communication

Disadvantages of this tool:

- The system is not very complex and so it is possible that important factors might be lost
- Relationships are not taken under consideration
- General strategies fail at special problems

The Balanced Scorecard

The development of the balanced score card resulted of the changed framework conditions. The Balanced Scorecard connects monetary performance indicators to a system of indicators. It is an instrument to put the strategic planning into practice.

The term "balanced" is used to show that four views are used to analyse an enterprise. These four perspectives are the financial perspective, the perspective of the customer, the process perspective, and the perspective of development.

The financial indicators are used to show if a strategy is successful and leads to improvements of the profitability, the returns, the financial strength or of the growth, to name a few of them.

The perspective of the customer studies the customer- and market-segments of the company. At this point is a distinction of quantifiable and unquantifiable measurands (see Tab. 3).

Quantifiable	Unquantifiable
Market-share	Special Service and Product
Customer Loyalty	Client Relations
Customer Satisfaction	Image of Products / Company
Customer Profitability	

Tab. 3: Example for quantifiable/unquantifiable Indicators³⁰

With the help of these, it is possible to focus on a definite product or sales area.

²⁸ see Baum/Coenenberg/Günther (2004), p. 72f

²⁹ see Baum/Coenenberg/Günther (2004), p. 72f

³⁰ adopted from Probst (2001), p. 10ff

The process perspective analyse the main process that is important to reach the defined target (see Tab. 4).

Three processes are to differ:

Innovations Process	Business Process	Customer Service Process
Useful?	Possible to optimize?	Optimization of:
Costly?	Fast delivery?	Service and readiness for delivery
Advantages to the competitors?		Payments...

Tab. 4: Internal Core Business Processes³¹

The innovations process explores the developing or present needs of the customer, and creates products that correspond to these needs and wishes. The business process, which is the second step, produces these products and delivers them to the customer. Finally, the customer service process looks after the customer. Another important perspective of the balanced scorecard is the development perspective. This perspective includes human resources, potential of the information system and, motivation and empowerment. The development perspective should guarantee that not only short-time success is important, but rather investments into the future and infrastructure lead to sustainability.³²

Each business area will be analysed with the help of these perspectives to gain a better transparency.

The resulting tasks of the balanced scorecard are:³³

- the connection between the strategic planning and the operational enterprise control,
- the identification of the cause-effect relationship,
- the integration of the performance indicators into the targeting processes,
- the guarantee of a general information cascade (top down, bottom up),
- the limitation of the performance measurements to only a few critical success factors, and
- to focus the budget and the controlling at theses indicators.

The field of application of the balanced scorecard should be independent strategic business units. Such a business unit execute its activities self-reliant through out the whole organisation. It has own products, customers, production-centres, marketing-units and an own strategy. If there are several business units with implemented balanced scorecards, it is necessary to proceed a top-down operation to avoid chaos and to focus on the common vision and strategy.

The balanced scorecard is not only useful for independent business units, but also for combines, non-profit-organisations, state-owned companies and joint ventures, because it helps to impair strategic targets beside the reduction of costs and their measures of implementation.³⁴

³¹ see Probst (2001), p. 12

³² see Kaplan/Norton (1997), p. 89ff

³³ see Kohlöffel (2000), p. 61f

³⁴ see Schedl (2002), p. 33f

Benchmarking

Benchmarking is an orientation on the best and will be discussed in detail in chapter 2.2.

Six Sigma

Six Sigma is a tool to reduce costs and increase quality and it is useful to introduce quality-management into a company. The original definition comes from the statistics. It is the standard variance of the Gaußian normal distribution. Motorola developed the Six Sigma analysis in 1979 because of their problems with quality. The Six Sigma scheme follows the DMAIC-cycle (Define – Measure – Analyse – Improve – Control).³⁵

- Define – A clear definition of the problem and the target of the project
- Measure – The measurement of all process relevant indicators
- Analyse – Evaluation of the measurements and identification of the causes of problems
- Improve – Selection of a solution and finally their implementation
- Control – The changed process needs a periodical control

The Six Sigma process analyses especially the Actual-process. Therefore, it is possible to analyse the process indicators in an objective and static way. The advantage of this method is that after the implementation of a solution a repeated analysis of the process can show the success of the project. Some companies request a Six Sigma standard of their suppliers to ensure the quality and cost-effective production of their goods.³⁶

2.1.2 Summary

The strategic planning is a very powerful tool to introduce a template for future success. But its limitations are that the future is uncertain and may differ from expectations of the plan, it is not process-based, the planning is difficult, expensive in time and money and it limits choices and activities for the organization in the future.³⁷

The strength-weakness analysis gives the entrepreneur a good general overview about the organisation and the market position. But its limitations are that this view contains only certain parts of the organisation and that the evaluation of the resources does not correspond to reality because assumptions are only subjective.³⁸

The SWOT analysis is useful to reduce a large quantity of factors into a more manageable profile, but this leads very often to a simplification of the business situation. Another problem is the classification of strengths and weaknesses or threats and opportunities. For example, a technical change can be a threat or an opportunity, or the culture of a company could be either strength, or a weakness.

The advantages of the GAP analysis are that deviations of the plan and the reality can be shown very easy and quickly and it is clear to understand what was missing during the completion of the project or process. But its limitation is that the process has to be started first before a GAP analysis can be done.

³⁵ see Töpfer (2003), p. 1027

³⁶ see Töpfer (2003), p. 1027f

³⁷ see Globalfuture (1998)

³⁸ see Baum/Coenenberg/Günther (2004), p. 71f

The product life cycle analysis has no general validity. It is only useful if all competitors have a standardized behaviour with a homogeneous and ideal development of their products. Another problem is that there is no standardized limitation of the phases and therefore the periods are not clear.³⁹

The balanced scorecard is a tool to implement a strategy within a company, but it has some limitations and disadvantages. One of the main disadvantages is the time needed for implementation, because of the large number of goals for the organization. Even if the balanced scorecard is well organised, it will fail, if there is a lack of participation from the management and/or the employees. Another problem may occur if too many measures are selected. To define these measures is one of the most difficult tasks. There is much room for errors, if the measures are chosen subjective or they are not linked properly to the defined outcomes.⁴⁰

Six Sigma persuades the strategy to identify and to eliminate causes of errors or defects within business processes. The limitations of this tool are the challenge of having data available, if the process has no data available at the beginning, the right selection of projects and their prioritization, or the easily digress into bureaucratic exercise.⁴¹

The usage of the different tools depends on the given tasks of the management. The strength-weakness analysis is only used for a business analysis. The gap analysis is a tool for an early detection of strategic gaps. It shows the difference between the planned and the actual timetable of a project. The SWOT analysis is a situation analysis and is used for a strategy development. It consists of two parts, the SW (strength-weakness) analysis as part of the analysis of the business and the OT (opportunities-threats) analysis as the part of the environmental analysis. The lifecycle analysis is used for the strategic planning. The portfolio analysis reconsiders the balance of the used resources. The basis for this analysis is a business and environmental analysis and leads after a market share and market growth analysis to business strategies. The balance scorecard persuades the strategic implementation with the help of a system of performance indicators. These performance indicators define not only strategic targets but also show possible deviations. The benchmarking, which basis is also a strength-weakness analysis, is a continuous process of improvement. The business activities and business targets are continually in comparison with its competitors. And finally, the six sigma is an analysis of the actual process to improve quality. The tools cover a wide spread of different views to a business and are often used together to reach a certain business target.

³⁹ see Coenenberg (1997), p. 42

⁴⁰ see Schedl (2002), p. 145f

⁴¹ see Antony (2004), p. 303ff

2.2 A general Overview of Benchmarking

The traditional definitions of economical targets and productivity are no longer useful. Only if a company or business orientates itself based on the industry best practices, the best methods and techniques, it will be possible to obtain the best performance. The process was discovered and developed by the XEROX Corporation in the early 1980's and was called "benchmarking".⁴²

'Benchmarking is the process of comparing one's own organisation with peers worldwide.'⁴³

More and more companies use this technique to define operational performance. Benchmarking is a structured process that supports the individual initiative of every employee. It is a process of comparison of an organisation to find out whether a performance is good or bad in relation to organisations, which carry out the same activities. This will help to identify "best practice" and will so lay the basis for improvement.

2.2.1 Benchmarking - An Introduction

Benchmarking is based not only on the internal view on a company, also the external world has to be continuously under investigation. Only the continuous search after the best methods, and the implementation into the own business process will lead to success.⁴⁴

The main steps to understand benchmarking and to gain success are listed below:⁴⁵

- **Understand the own business processes.** It is of importance to know the weaknesses and strengths of the internal sequence of operations. Only with this knowledge, a company will be able to turn weaknesses into strengths, to be successful within the future.
- **Understand the leading companies in the industry.** A company makes only progress with its resources in the industry if it knows the strengths and weaknesses of the other competitors and, the more important point is, that only the understanding of the best practice will lead to top performances.
- **Imitate the best.** Learn from the leading companies in the industry. Find out in which business segment they have their strengths, why they have it there, and how they reached it. Imitate and copy these strengths, adapt it to the own business and try to overflow it.
- **Achieve the superiority.** If all the former points are successfully implemented into the own business and all weaknesses were removed and the own strengths were optimized, and then the company will be in a position of superiority.

⁴² see Camp (1994), p. 1ff

⁴³ cit. Daniels (1996), p. 18

⁴⁴ see Camp (1994), p. 31f

⁴⁵ see Camp (1994), p. 31ff

If an organisation knows how to compare to its competitors, it can help to:⁴⁶

- understand the factors and circumstances that make an organisation successful
- identify the areas where weaknesses and problems occur
- find out where improvement is necessary

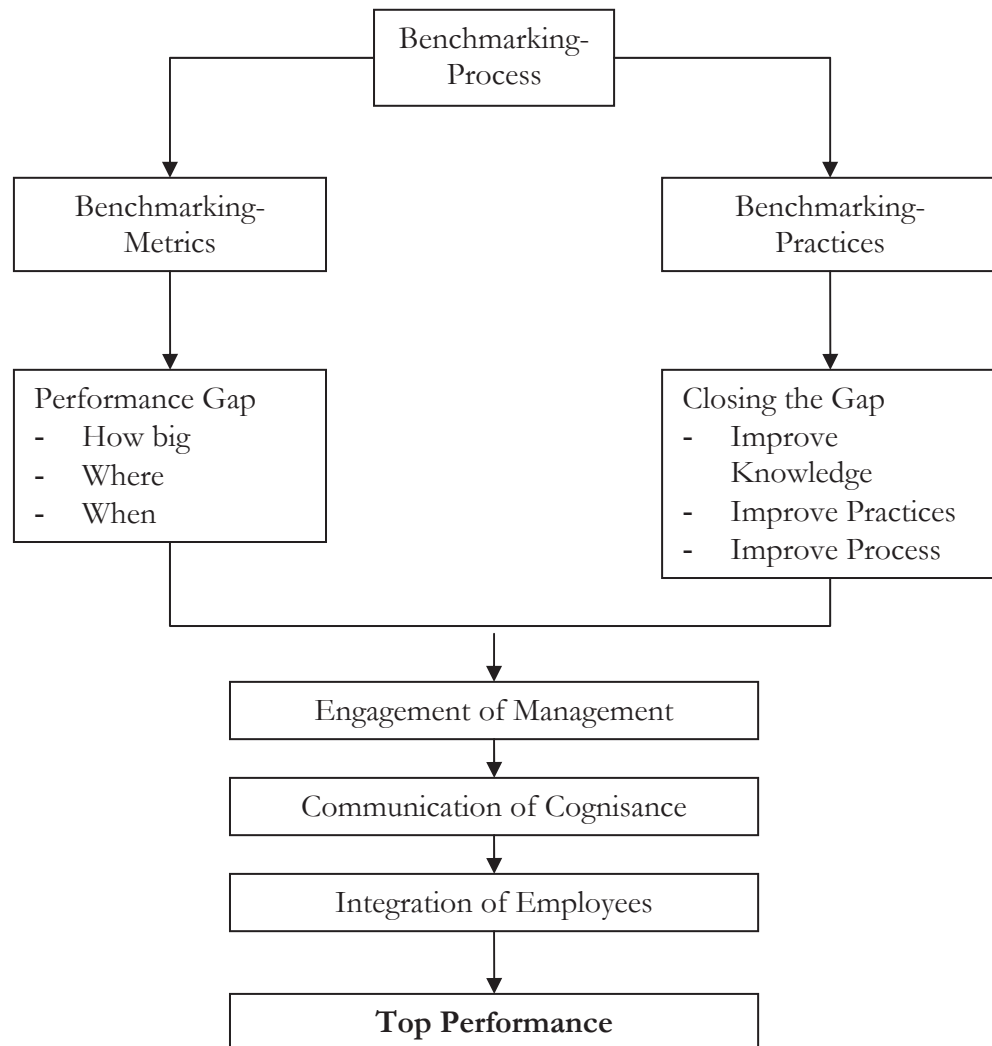


Fig. 6: Benchmarking Process in general⁴⁷

Firms are always on the search of higher efficiency and therefore they compared the overall performance of their company as well as the performance of segments with each other. This comparison was often done within the company only (internal benchmarking), which lead to an intensify sense of superiority and to the “not-invented-here” syndrome with the argument that another company’s methods do not fit into the own company. However, the comparison with competitors can show the best practices in the industry and can

⁴⁶ see Camp (1994), p. 49f

⁴⁷ adopted from Camp (1994), p. 21

encourage overtaking these practices. Benchmarking is the procedure to compare the efficiencies of organisations with each other.

In this case benchmarking will be discussed as acquisition of information, which allows the management to compare segments with the same function or value with segments of other firms.

Although benchmarking should be a continuous process, it is often started in the moment of losing shares of the market, or the profits decrease, or the customers become discontent. The target of the management, with the help of the benchmarking process, is to identify companies, which have top performances in the functions that should be benchmarked. Therefore, it is inconclusively that these companies are in the same branch of industry.⁴⁸

With the help of Fig. 7, the basics of a benchmarking process can be described.

First step is to decide what will be benchmarked. This is decided by corporate or divisional leadership-teams. Therefore, it is necessary to identify “critical success factors”, which are part of the company’s strategic direction. Critical success factors are identified as vital for successful targets to be reached and maintained.⁴⁹

The second step is to form a benchmarking team. The members of such teams define the fields of activities of the members, define milestones, and define the processes to be benchmarked. Defining a process includes the definition of a process’ start and end-points, designing a flow chart, the determination of critical success factors and the decision on the critical performance measures.

Step 3 is to identify benchmarking partners. These partners are considered to be the “best” in the industry and they can be competitors or also non-competitors. This depends on the type of benchmarking and on the process or function that should be analysed.

The fourth step is the collection and analyse of the information. This step is perhaps the heart of the benchmarking process. During this step not only the collecting of data is done, but also the understanding how the best practice is reached and how it can be integrated into the own business or process.

The fifth and last step is the adoption and improvement. If the best practice is found, it is necessary to adopt it into the own organisation’s culture, technology and human resources. Some of these improvements may be immediate and short-timed, and require only a few or no additional resources, while others will be long-term and need more or additional resources. The measures and indicators that are developed in the planning phase can now be used to control the improvements.⁵⁰

2.2.2 Reasons for Benchmarking

This part answers the question, why benchmarking should be done. There are certain reasons to execute benchmarking and a better understanding of the most important reasons will lead the study into the right direction.

There are five essential advantages for benchmarking:⁵¹

1. Better understanding of customer requirements
2. Definition of targets based on consensual point of view
3. Definition of real performance indicators
4. Acquire a competitive position
5. To become conscious of the best practice in the industry and to search after them

⁴⁸ see Camp (1994), p. 49ff

⁴⁹ see Bnet Dictionary (2008)

⁵⁰ see Bhutta/Huq (1999), p. 254ff

⁵¹ see Töpfer (1997), p. 5f

With the help of performance indicators during the benchmarking process it is possible to measure the progress and the benefit of the study.

The targets that are persuaded by such a benchmarking-study should be understood and agreed of the operating management before the beginning of any support of such benchmarking-activities.

Benchmarking is a tool to reach an objective target. Of more importance is that it is a tool to discover, to understand, and to reach new practices. Beside this, the motivating part is of great importance. The benchmarking-activities should be fully integrated into the operative business, because then the organisation will be able to change and improve existing working practices without any dictation of the management.

The main benefits resulting of the benchmarking are the compliance of customer wishes, the definition of targets, the measurement of real productivity, the attaining of competitiveness and the certainty that the best practices is included into the working process.

For the further consideration, it is useful to see a business area as an end-to-end process that includes many small processes. A typical single work process either it is a product or a service exists of three main components: an input, a processing step, and finally an output. The expectation on the output is that it satisfies the needs of the customer. The output can vary from typical office services to the furnishing of a car. The result is that the produced achievement has value and meets the needs of the following process or of the ultimate user.

If an organisation only looks at its internal processes, it will have its own opinion of the needs of a customer. This internal view does not lead to developments of practices that will meet the requirements of the ultimate costumers. Only a view that also includes external impressions ensures that customer demands will be defined, documented, and finally put into practice. Benchmarking is the process to detect such needs, by searching the best practice of the industry.

Benchmarking brings to a higher awareness for products, costs, markets and for the plans, which leads to success. The continuous external view, the testing of ideas, methods, practices and the integration of these in plans and programs is the only way to ensure competitiveness. The focus on direct competitors is a possible way for benchmarking. In general, not only the direct competitors will be looked at. During a benchmarking-process, it is the purpose of a company to identify the best practice for a function wherever they may find them. The acquisition of well-tried methods and techniques over a wide spectrum of industries will be the right way to gain competitiveness.

The external view also helps to fight against the not-invited-here syndrome. Because of the finding of proven practices of the industry, the argument, that something could not work, will be exhausted. This is a structured way to study other organisations, to adopt the best methods and processes, and to adjust these for its own needs. The combination of the internal operational inventory taking, the structured benchmarking and the inventiveness together with the ability to identify business bets lead to better strategies and therefore to satisfied customers.

To be successful with benchmarking several points must be in mind:⁵²

- Engagement and cooperation of the management
- Full understanding of the own working process
- Willingness for changes because of the results of the benchmarking-study
- Realization that the competitors continuously improve
- The willingness to exchange information with benchmarking-partners

⁵² see Camp (1994), p. 47

- Adherence to the ten-steps-benchmarking-process (Fig. 3)
- Open-mindedness to new ideas
- Benchmarking will be continuously continued
- Benchmarking becomes institutionalised

2.2.3 The main Steps of the Benchmarking Process

Some companies use up to 33 steps for benchmarking, but a fundamental process evaluation identified five major components. These main steps of the benchmarking-process and the ten steps Xerox methodology are shown in Fig. 7.

Planning

The target of this phase is the planning of the benchmarking investigation. The main steps are common to every planning – the what, who and how?

What should be benchmarked? Every function of a company has, or delivers a product. This product is the result of a business process no matter if it is a physical product, an order, a delivery, a bill, a business service or a report. It is possible to use benchmarking for all these and many outputs more. This is the reason to define the “product” first.

There exist numerous varieties of benchmarking. A few are highlighted below:⁵³

Performance benchmarking	it is the comparison of performance measures for the purpose of determining how good our company is as compared to others
Process benchmarking	methods and processes are compared in an effort to improve the processes in our company
Strategic benchmarking	the study is undertaken when an attempt is being made to change the strategic direction of the company and the comparison with one’s competition in terms of strategy is made
Internal benchmarking	involves measurements and comparisons of activities, functions and processes between departments/divisions of the same company or organization
External benchmarking	is the comparison of similar operations, systems and processes with external organisations
Industry benchmarking	is a comparison, which is a larger group than the direct competitors
Competitive benchmarking	is performed against “best” competition to compare performance and results
Functional benchmarking	a benchmarking study to compare the technology/process in one’s own industry or technical area. The purpose of this type of benchmarking to become the best in that technology/process

⁵³ see Bhutta/Huq (1999), p. 257

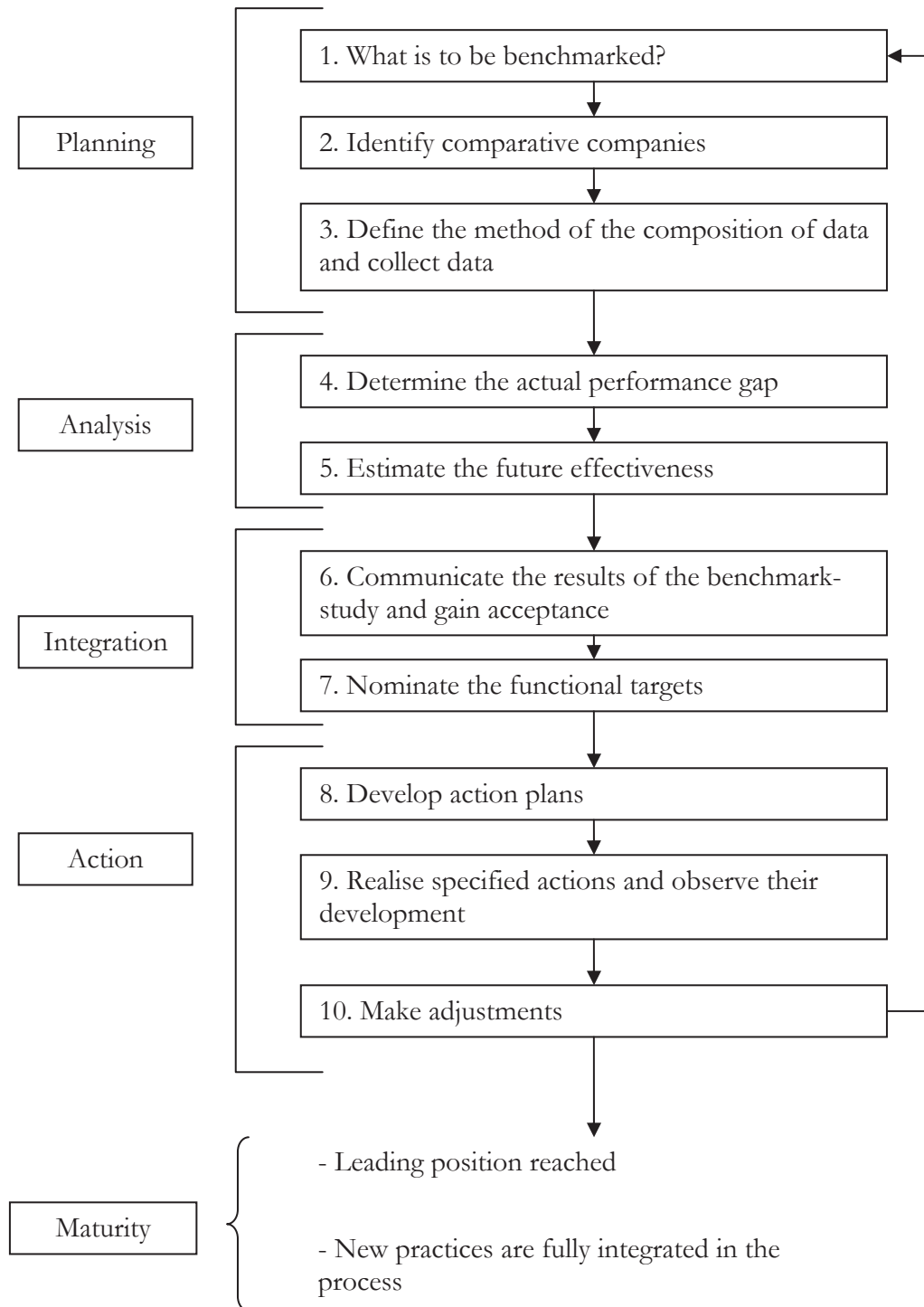


Fig. 7: Main Steps of the Benchmarking-Process shown by XEROX⁵⁴

⁵⁴ adapted from Camp (1994), p. 47

	Internal Benchmarking	Competitor Benchmarking	Functional Benchmarking	Generic Benchmarking
Performance Benchmarking	b	a	b	C
Process Benchmarking	b	c	a	A
Strategic Benchmarking	c	a	c	C

Relevance/Value High a Medium b Low c

Fig. 8: The Benchmarking Matrix⁵⁵

The benchmarking matrix (see Fig. 8) shows the relevance and dependence of the different benchmarking varieties and how they can be linked together.

With whom or whereof we want to compare? This is possible with competitors that produce the same, which will be the first address for a comparison. This is not enough. Benchmarking must be done also cross-industry to reach top performance.⁵⁶

How will the data material be assembled? There is not only one-way to carry out a benchmarking-analysis, there are nearly unlimited possibilities to gain the necessarily data. Most of the needed data are public and so immediately available for use. Important to understand is that a benchmarking-process not only derive quantified targets. More important is that the best practices in the industry should be investigated and documented. The benchmarking-analysis should be concentrated on methods and practices. The effect, of such an analysis, can always be quantified.⁵⁷

Analysis

After the definition of the What, Who and How, it is necessary to collect data and to carry out the analysis. During this phase it is important not only to check the own processes, but also the practices of the benchmarking-partners, because finally the benchmarking-process is a comparing analysis. The understanding of the strengths and weaknesses is the target of the investigation. Are the benchmarking-partners better? Why are they better? How much are they better than us? How can their practices be adapted or adopted?

The answers to these questions are the possible lacks of performance: positive, negative or equal. These lacks are the objectives on which the company has to act. Is there a gap to close or has the company an advantage. The gaps will change if the practices in the industry will change. Therefore, it is necessary that the benchmarking-process keep a continuous process.⁵⁸

Integration

Integration means the process to channel the results of the benchmarking-study into the in-plant system and to make necessary changes. This process includes the proper planning of new practices, which are included in the existing business procedures. A first step is to

⁵⁵ adapted from Leibfried/Mcnair (1992), in Bhutta/Huq (1999)

⁵⁶ see Töpfer (1997), p. 44ff

⁵⁷ see Töpfer (1997), p. 44ff

⁵⁸ see Camp (1994), p. 31ff

achieve the acceptance of the benchmarking-results of the management and of the department units. Therefore, it is necessary to picture the results in a clear and comprehensive way based on correct and real data material. The knowledge gained from the benchmarking has to be communicated to all areas of the organisation to gain support, commitment and to take ownership. The key of this process is the implementation of the benchmarking-results into an announcement of in-house principles. With the help of this announcement, it is possible to evaluate all actions of alteration.⁵⁹

Action

The results of the benchmarking-process and the operative principles that followed of the benchmarking have to be put into practice. Simultaneous the progress must be checked periodically. It is necessary that those who execute the business process also build in the new knowledge, so that they can use their creativity. Additional to this, every plan of change should have milestones because of the continuously change in the external practices.⁶⁰

Maturity

Maturity is reached, if the best practices of the industry are integrated in all business processes and top performance is reached. It is also reached, if benchmarking becomes a continuous, important, and self-triggering part of the management-process – benchmarking becomes institutionalised. It is carried out in all levels of the organisation and not only of specialists. Benchmarking only will lead to top performances if the attention lays on the external practices of the responsibility of the whole organisation.⁶¹

2.2.4 Targets of Benchmarking

One of the most difficult steps of the benchmarking-process is to identify and to define the objective of the study. The way to get a satisfactory result is to split the end-to-end process into its individual processes, which performances should be the basis for the benchmarking-study.

The decision of what should be benchmarked is the identification of the function's product, because this product or performance may not be clear defined. The performance of a production process is a good that can be quantified, but it is more complicated to define a product of a service.

There are at least two ways to find clearness in the product- or performance-definition. One way is to start at a high, strategically level and to break up the process chain to the single performance steps. Another way to solve this task is to evaluate a list of questions, which can detect the problem area that should be benchmarked.

Normally has every organisation a so-called mission statement that summarise the purpose of the organisation. With the help of this mission statement, it is possible to derive the typical performances that are expected. This is the first step of splitting the general task into the specific performances, which should be benchmarked. This process is not mysterious but it needs a lot of intellectual spirit.

The specification of the mission statement and the products is the basis for the detailed definition which performances should be benchmarked. At this point, it is necessary to

⁵⁹ see Camp (1994), p. 31ff

⁶⁰ see Camp (1994), p. 31ff

⁶¹ see Töpfer (1997), p. 120f

decide about the level of detail. In general, it is advantageous to identify performance indicators. The definition of performance indicators and their importance is described in chapter 2.3. The definition and level of detail of the indicators depends on the knowledge of the industry and on the impact of the achievements to the costs.

Another possibility to define performance indicators is to take the indicators that are already part of the existing reporting system. Benchmarking can lead to new indicators that are included to the reporting system. The actual system should be the logical start, because of the given metrics and the given statistics. Nevertheless, this must be looked with caution, because these systems are often oriented on the financial aspects and the actual industrial performances are not represented properly in acquired data and information.

The reporting system cannot be completed enough. It is not only necessary to derive the single performance steps of from the substantial performance steps, but also that the performances can be put together logically and analytical back to the main performances.

The level of detail must be weighted up. It must be low enough to quantify the changes but high enough to present the effects in a clear form to the management.⁶²

2.2.5 Identification of Benchmarking Partners

This chapter leads to an important aspect of benchmarking, in particular to find and to use the sources of information needed. It describes the way to find the right companies and benchmarking-partners. During this chapter, not only the process of identification of benchmarking-partners will be looked at, but also how to filter the information of the first-rated sources of information and the description of the four fundamental types of benchmarking will also be a part of this chapter.

It is possible to do benchmarking upon internal functions, external direct product competitors, leading industry and in general upon functional processes. Some of these can be done easily but others like the benchmarking against competitors is compellingly. Every possibility must be examined on its value of the information. Tab.5 shows a comparison of same of the key characteristics to different types of benchmarking.⁶³

Types of benchmarking	Relevance	Data easy to get	Innovative practices
Internal functions	x	x	
Direct product competitors	x		
Leading companies in the industry		x	x
Generic processes		x	x

Tab. 5: Key Characteristics⁶⁴

At the beginning, these types can be used to check how they can bring relevant data for the benchmarking operations, their potential for innovation and if the data is easy to get. Internal comparison and comparison with competitors seem to be the most interesting

⁶² see Camp (1994), p. 31ff

⁶³ see Camp (1994), p. 69ff

⁶⁴ adopted from Camp (1994), p. 49f

possibilities for benchmarking but mostly they are within the same industry. The internal comparison of different production lines or business divisions is possible, but it may not be the best way, because there is no guarantee to find the best practice.

It may be a mistake to start benchmarking immediately with the visit or the initial contact with different companies, because it can lead to a waste of valuable resources. Sources of information for a benchmarking study are expensive, therefore it is necessary to analyse the sources of information before starting visits or starting other formulations of benchmarking. The advantage of this procedure is a concentration on the available information and so it is possible to focus on main emphasis to find information of the highest priority for the benchmarking process.

Another reason to prefer the search of information instead the direct contact is that the research with existing data and information may lead to new sources of information. An example are the references in periodicals. Selective visits at competitors should only be done if any possibilities of collecting information have reached an ending.

There exist at least four types of benchmarking: (1) internal benchmarking, (2) external benchmarking with direct competitors, (3) benchmarking with the best companies or the market leader, (4) benchmarking of general processes.⁶⁵

Internal benchmarking

Internal benchmarking is often used in international companies or companies that have different subdivisions with similar functions. This is one of the easiest benchmarking-studies. This first step is not only a good basis for an analysis of differences but also the basis to find main emphasis. Such an investigation can deliver immediately useful information.⁶⁶

Competition benchmarking

Direct competitors are the obvious partner for benchmarking-studies. They have to fulfil comparison tests, because it is the task of a benchmarking-study to find the advantages and weaknesses compared to the direct competitors.⁶⁷

Functional benchmarking

If the main interest of the benchmarking-study lies in the improvement of functions, it would be a possibility to identify leading companies in different industries. A key of success is to evaluate if the leading companies are driven by the same customer demands. There are other reasons of the productivity of functional benchmarking. Mostly it is easier to exchange data because there are fewer problems with confidentiality and the partners are also interested to understand the methods in other industries. The experience showed, that methods of other industries had a higher acceptance then such from the same industry.⁶⁸

Generic benchmarking

There are processes and business units, which are the same no matter which industry. An example is the order procedure. Benchmarking for such a process is not only limited to a product or an industry. It is possible to analyse the order procedure process both for

⁶⁵ see Camp (1994), p. 71ff

⁶⁶ see Camp (1994), p. 71ff

⁶⁷ see Camp (1994), p. 71ff

⁶⁸ see Camp (1994), p. 71ff

electronically-, chemical-, and food-products as the process for other products or services. The advantage is that proven techniques and practices can be adopted immediately.⁶⁹

2.2.6 Methods for Collecting of necessary Information

The sources of the necessary data and information decide the method for the data acquisition. Before the start of the data acquisition, it is necessary to think about the quality of the data. Some criteria and characteristics need a particular consideration. This means accuracy, reliability, procuring costs, expenditure of time and the question if specialists are needed. The volume of the gained data results not only of the accuracy but also of the use of the data.

The procurement to gain the necessary data and information is expensive and it takes a lot of time. Therefore, it is important to find the accurate benchmarking-method. It is also necessary to analyse the importance of specialised knowledge. Although contacts with competitors are favourable, so it is sometimes better to contact the manufacturer directly.

The way to gain necessary data and information leads from internal sources of information to the research in public sources until independent studies and searching. The number of sources of data is immense large, but this table only shows the most important sources (see Tab. 6).⁷⁰

Internal sources

To gain internal information many sources are possible. The only limiting factor is the person, who does the research. The three most common internal sources are the product analyses, specialists and the footboard studies.

In the product analysis, it is the common practice to analyse competing products in-house. These products are used or disassembled to study their functions, materials, and characteristics. This is one of the obvious methods of benchmarking. Another possibility is to order a product at a competitor to make conclusions about their logistics.

There are two reasons to do an internal search for data and information that are from interest. One reason is to bring all documented data together and the other is to register all persons who may be productive sources of information. These people include both market-researcher and the in-house experts.

The footboard studies are a special case of networking. These studies allow the continuous benchmarking-process to keep cheaper, because the persons who work on the continuous process to stay at their working place and to interchange with other experts.⁷¹

External sources

The second category of sources of information are that ones that are public available. The amount of information is enormous and so the key is to find these information within a justifiable expenditure of money and time. External information exist in many shaping. The traditional sources are – journals, annual reports and other printed documents. Other not so common sources are – seminar lectures, conference reports, articles, and others. Trade associations may also be a point of contact for information and for identification of possible benchmarking-partners. The advantage of such associations is that they are concerned with the topic and so they are useful for contacts and references in the functional areas. Another advantage is that the utilisation is moderately priced. External

⁶⁹ see Camp (1994), p. 71ff

⁷⁰ see Camp (1994), p. 93f

⁷¹ see Camp (1994), p. 91ff

experts like consultant companies, brokers, system developers and universities, could have valuable information for benchmarking-activities. Also if they do not have direct knowledge so are they able to give useful hints to other persons or places where new information and data may available.⁷²

Own inquiry

If the search with the help of the former discussed internal and external sources is not successful the own inquiry is asked. The essential disadvantage of self-employed investigation is the costs and the time that has to be invested. Possibilities of such own searches are questions forms, followed by firm visits and later on by advanced techniques like discussion circles with benchmarking-partners.

The advantages of questionnaires are the throughout documentation of the questions of interest, the complete representation of the data, and they secure anonymity. There are four kinds of questions: (1) open questions, (2) multiple choice questions, (3) exactly one answer of multiple possibilities, and (4) an evaluation as performance indicator. Every method has its advantages and disadvantages, but the most important thing is the formulation of the question. They should be as neutrally as possible.

Another option to gain benchmarking-information are telephone surveys. These phone calls should be from expert to expert to ensure the best success.

The most interesting and successful benchmarking-method is a visit at the benchmarking-partner. This option needs a good preparation and planning to concentrate on the critical questions during the visit.⁷³

⁷² see Camp (1994), p. 91ff

⁷³ see Camp (1989), p. 130ff

Source	Example
Internal	
Literature databases	AB-Information
Internal studies	Internal experts
Internal publication	Company-specific
External	
Trade associations	American Marketing Association
Industrial publications	Electronic Business
Special reports	ADL Infotran
Journals	Journal of Petroleum Technology
General Management	Industry Week
Periodical	Annual Reports
Seminars	Job-specific
Statistics	Dataquest
Experts of the industry	K.L. Worthington
Software/Hardware provider	DEC
Universities	Subject-specific
Advertisements	Product-specific
Papers	Depends on the examination object
Own research	
Customer surveys	Stakeholder
Telephone surveys	Special operation
Information services	Individual contracts
Networks	Electronically, internal and external
Consultants	McKinsey

Tab. 6: Sources for Information⁷⁴

2.2.7 Identification of the Gap in Performance

After the measurement of the company's performance, the visits at benchmarking-partners or other methods of data composition and acquisition the next step is to analyse the data for comparison to the internal functions. This comparison will show a positive or negative gap in the examined function. A positive gap means an advantage compared to the competitors, whereas a negative gap shows deficits in the performance.

There are three kinds of performance gaps: negative, equal, and positive (see Tab. 7). Important during the analysis is the objectively evaluation of the gaps quantity and an explanation of the gaps existence.

⁷⁴ adopted from Camp (1994), p. 94

Special attention needs the performance gaps that have different external practices. These have to be analysed in particular, if they can be adopted into the existing functions and practices.

A negative gap means that external functions represent the benchmark. Their best practice is definitively superior and it will take great effort to change the internal practices to get equal with the external performances or even to beat them.

The functions and practices are equal if the studies did not find any meaningful differences. Although these results may be calming, there is no place for idleness. The analyses and documentations show only the actual moment. The methods and procedures change continuously and the equality is only given for a short moment.

Positive gaps show the own superiority. This could be a result of surprise but the target of benchmarking should be the predominance, if it is done over a period. If the methods are clearly understood and if the right performance indicators were found, it is possible that the gained numbers show the superiority of the internal functions.⁷⁵

Sort	Description	Conclusion
Negative	The external practices are superior	Benchmarks are based on external practices
Equal	There are no significant differences	Further analyses are necessary
Positive	The internal practices are superior	Benchmarks are based on internal practices

Tab. 7: Sorts of Performances Gaps⁷⁶

2.2.8 Communication of Benchmarking Results

The communication of benchmarking results is a critical step. It is important to convince the opposition to accept the results with the help of a good planned communications campaign. Therefore, it is necessary that the persons who have to adopt the new practices will also do this. That means that the communication has to be customized to the target group. The results of the benchmarking-study have to be communicated internal and external of the corporate hierarchy.

There are three main steps to communicate the results to the affected persons and organisations. The method of communication must be customized to the audience and the benchmarking-knowledge must be arranged in a way so that it can present in an optimal and understandable way. The management has to identify itself with the new benchmark to support the implementation. It is also necessary to inform the employee to get their support.

Different methods for communication proved to be successful. These methods include written reports, reports of visits, memos or a benchmarking-newspaper and a benchmarking-network. A written report that summarizes the results in the right level of detail is an effective tool to reach understanding. Reports of visits at companies fit for the communication of special findings.⁷⁷

The benchmarking-study must have a structure that enables a good presentation. It should contain a summary, a description of the processes, a presentation of the results, and a

⁷⁵ see Kohlöffel (2000), p. 176

⁷⁶ see Camp (1994), p. 152

⁷⁷ see Camp (1989), p. 200f

presentation of the used data and information. The summary should concentrate on the main results, conclusions, and recommendations. It should also contain a comparison of the best practice to the present practices. The importance lies on the performance gaps and their effects.

The objective is to get feedback of the organisation with factors that encourage or inhibit. If the analysis is done by brainstorming, so it is possible to identify the problems immediately. With the actions taken from this analysis it is possible to reach the required final state in a short time.⁷⁸

2.2.9 Actions and Progress Control

This chapter contains different points for the implementation and the controlling of the benchmarking-process. Benchmarking has the potential to re-orientate resources and this re-orientation can be very important for the success. Two important aspects of benchmarking have to be controlled:

- (1) the effective use of the ten-steps-benchmarking-process and
- (2) the results that are expected.

The effectiveness control follows the usual formulations, which are standards in the industry: comparison of the progress in relation to defined milestones, the determination of the reasons for variations, the lead-in of compensatory measures, and the checking of the results together with the management.

The real value of benchmarking is given, if a company begins with the implementation of best practices. The measure can lead to a new strategically reorientation to reach high performance. Benchmarking is a possibility to picture the competition on the market, how it is shown in the best practices, by including these processes into the budgetary planning and into the plans of action.

To ensure that benchmarking will be really integrated into the company, it should be implemented into the vital processes of the businesses. There are four critical scopes: the planning process, the management process, the quality process, and the financial process. The planning process is the primary scope that defines the strategically direction. The management process is the process of how decisions are done. The quality process ensures the customer satisfaction. The financial process ensures that resources are used on the places they are needed.

To ensure the success of the implanted benchmarking-process a periodical screening of the progress is necessary to have the possibility to act before variances occur.⁷⁹

2.2.10 Summary

Successful benchmarking requires three basic ingredients: a function, product or service, that should be check against similar, access to benchmarking partners to find the best practice and finally a benchmarking team that has the knowledge to implement benchmarking within the company. During this thesis, two types of benchmarking are of importance – the performance benchmarking, and the strategic benchmarking.

⁷⁸ see Camp (1989), p. 200ff

⁷⁹ see Camp (1994), p. 245ff

This thesis is primary a performance benchmark with the comparison of performance indicators. Secondary a strategic benchmark can be interpreted, because during this thesis different strategies of the companies can be read off.

The performance benchmarking is the comparison of the own performance to the performance of other companies with the same functions or processes. The advantages of this type are:

- a wide range of performance indicators can be studied
- allows a comparison to other competitors
- assists in identifying priorities for improvement
- provides a cheap way of making comparisons internationally

But there are also some disadvantages like:

- difficulties to find an agreement on the indicators
- difficulties to define the data
- gives only limited information about how to correct performance shortfalls

The performance benchmarking can lead directly to improvements, or it may be a pointer to specific processes that may be improved through deeper studies using process benchmarking.⁸⁰

⁸⁰ see Jahns (2003), p. 8

2.3 Performance Indicators

To be successful with the named tools of strategic controlling not only the understanding of these tools is important. Also of importance is the definition of success factors or performance indicators to measure the success or efficiency of a company or business. "Success is the achievement of something desired, planned, or attempted."⁸¹ Success factors are necessary to identify these elements of success. In this context, key performance indicators (KPI) are used to measure the attainment of these success factors. A KPI is measure, that quantify objectives and enables the measurement of strategic performance (e.g., a success factor may be the maintenance of a service during a change; a supporting KPI would be the percentage decline of interrupted services because of changes).⁸²

Performance Indicators and report systems are an important part of a company's information system that is necessary to keep the management, the stakeholders and the employees currently informed. Because of the technical boom in companies during the last years, some managers believe that the information problems in house could be solved only by purchasing the newest and most modern technical applications, like new software or intelligent technology. However, not infrequently, this is a misunderstanding and too much information paralyses the system.⁸³

It is paradoxical that an unsatisfied supply with information is characterised by absence and surplus of information.⁸⁴ Reasons for this development are the lack of "real" information, that is not available and the presence of "information" that is not really information. This means that many data is present, which is not necessary for a current project or analysis. On the other hand, not all information has the same value for the recipient (see Fig. 9).

The knowledge surplus leads to unnecessary audits of usefulness and a lack of knowledge leads to an under supply that causes wrong decisions.

The key to avoid such developments is the necessity to define the real need of information and the kind of information that is needed for the company and the strategic management delivers the basic systems.

To define its need for information it is necessary to differentiate the "relevant" information. The understanding of "need of information" is "relevant" knowledge, which means that only knowledge is needed, that is necessary to accomplish a task.⁸⁵

To reach the goal of a well and right informed company, performance indicators are introduced. Performance indicators are quantitative information with special formal characteristics. Important formal characteristics are given by the behaviour characteristics of the employees and of the management.

There are different types of performance indicators for different areas of application:⁸⁶

- Quantitative indicators can be represented as a number
- Practical indicators interface with existing company processes
- Directional indicators specify whether an organisation is getting better or not
- Actionable indicators are sufficiently in an organisation's control to effect change

⁸¹ see American Heritage Publishing Company (2003)

⁸² see Brown (1997), p. 158; see Dugmore (2006)

⁸³ see Gladen (2001), p. 1

⁸⁴ see Gladen (2001), p. 1

⁸⁵ see Gladen (2001), p. 4

⁸⁶ see Gladen (2001), p. 4f

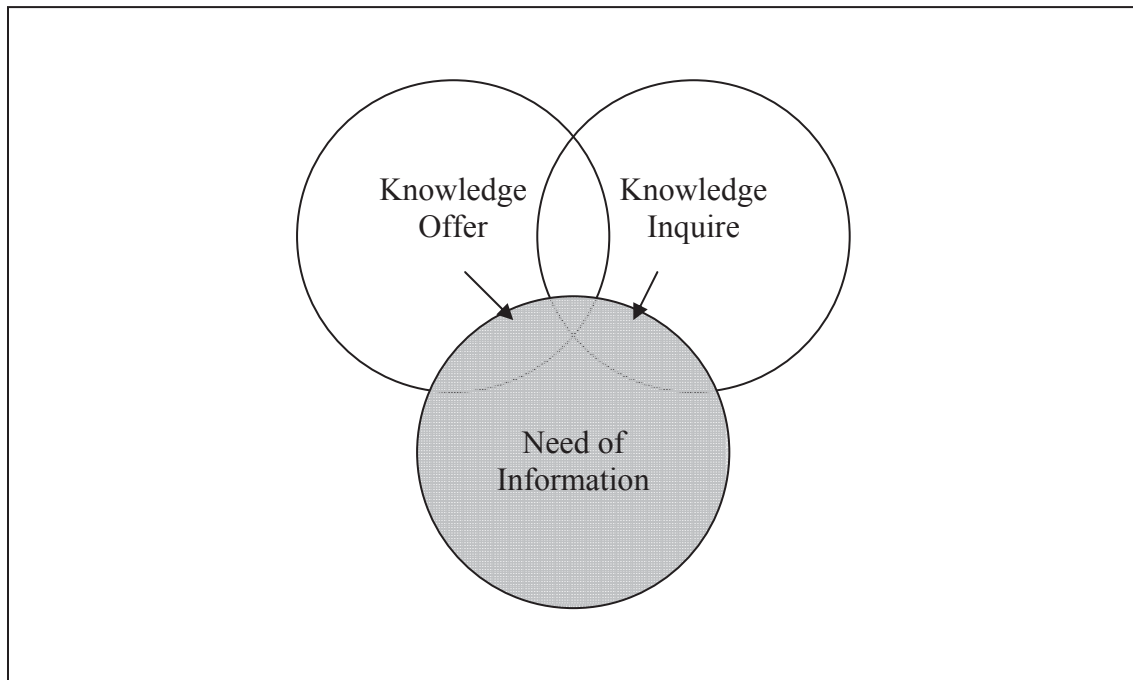


Fig. 9: Information Supply Situation⁸⁷

Types of Performance Indicators

“A performance indicator is a relevant number, relating to a realisation goal and has therefore in comparison to other numbers a special logical value.”⁸⁸

This means that a performance indicator has the task to enable analysis of events of the past and it have to same meaning in every business unit. The mathematical or information background of such an indicators should be equal in every company, so that it can be useful for comparison.

Before it is possible to define performance indicators, it is necessary to define a measuring system. In general, such a measuring system should include the following six categories:⁸⁹

1. Financial Performance
2. Quality of the product and of service
3. Performance of the supplier
4. Customer satisfaction
5. Performance of processes and operations
6. Co-worker satisfaction

The categories of the performance indicator system are not as necessary as the fact, that the needs of the owner, the customer, and the co-worker must be equally considered. It is also of importance that such a system includes a mixture of indicators of the past and of the future. This is necessary to measure the progress of the defined long-term targets.⁹⁰

The chosen indicators to look at should be relevant for industries and business. That means that for example the petroleum industry will have other performance indicators than

⁸⁷ see Berthel (1975), p. 30

⁸⁸ see Staudt/Groeters/Hafkesbrink/Treichel (1985), p. 24

⁸⁹ see Brown (1997), p. 43

⁹⁰ see Brown (1997), p. 43f

a bank or a university. A university may focus their performance indicators to the graduated students where as the petroleum industry will focus on their production rate or their amount of reserves.

Types of indicators every organisation or company need are indicators about the financial performance. The challenge behind this is not only to find valuable and representative statistics but also to limit them. A good catalogue is one that includes performance indicators of the past, the present, and the future. However, the look into the future with the help of performance indicators still depends on interpretation, and not on real answers. There are different values that could be taken under consideration to measure the financial performance of a company like cash-flow, profit, revenues, expenses, liabilities to name only a few of the traditional performance indicators. Since every company is forced to publish, an annual report each year the opinion could be that all this numbers in such an annual report are performance indicators. Fact is that the companies measure too much and so only a few of this huge amount of numbers are really indicators that show the performance of an organisation.⁹¹

To work accurately it is necessary to make a concept that includes following parameters:⁹²

1. Historical data: How did we perform last month, year...?
2. Present data: How do we perform now and today?
3. Future data: How will be the performance in the next months or years?

Data in annual reports is historical data. It shows the investor or other interested persons how the organisation performed in the last year. This data is indeed interesting, but the manager has no possibility to influence all developments in the future. There are several typical basic indicators like the cash flow, orders in hand, outstanding debts, daily turnover, cash and the total assets in relation to the liabilities.

If a company will be on top following points have to be taken under consideration:⁹³

- Only a few financial key performance indicators measure the performance of the organisation
- Financial indicators have to show the performance of the past, the present and of the future
- Financial statistics are engaged with the critical indicators for success
- Economical Value Added (EVA), Market Value Added (MVA) or Return on Investment (ROI) are used to promote growth which is profitable
- The organisation knows their real costs for their processes
- The organisation analyse and improve continuously their financial performance indicator system

The measurement of customer satisfaction is still a weak point in many companies. A key to gain good information about the satisfaction of the customers is to find a mixture between the opinions of the customers and the real purchase-held back. The data of the opinion poll helps to intervene if problems occur and the purchase-held back are the facts

⁹¹ see Brown (1997), p. 44f

⁹² see Gladen (2001), p. 52

⁹³ see Brown (2001), p. 60

about the statements of the customers. Performance indicators for customer satisfaction could be lost or gained customers, the market share in relation to other competitors or repeated businesses.

To reach good results in customer satisfaction following points should be persuaded:⁹⁴

- Classification of the customers with similar needs, and special needs are asked once a year
- Preparation of special opinion polls for each group of customers to measure their satisfaction
- A least two times a year a group of customers are interviewed
- Several times in the year meetings are hold with different groups of customers to gain quantitative customer satisfaction data
- The customer satisfaction of the most important competitor is determined
- Different hard and soft data about the customer are recorded

To measure quality of products and services:⁹⁵

- Introduction of quality standards for products and services that are founded on the quality standards of the best organisations worldwide
- Benchmarking with other competitors
- The amount of spot-tests is large enough to gain representative data

In a more general way, the task of performance indicators is to:⁹⁶

- Show complicated economical structures, actual situations and process in a relative uncomplicated way
- Ensure a complete and fast overview
- Help the management with decisions
- Help the management by its controlling tasks by eliminating irrelevant information

The first step to lead a business or company to success is an internal analysis of the functions and processes. If the results are unsatisfactory, the next step will be the definition of functions that needed to be improved. Therefore, it would be necessary to define indicators that reflect the performance of these functions. This step can be done with tools of the strategic controlling and is an important way to lead its company or business to better performances.⁹⁷

⁹⁴ see Brown (2001), p. 85

⁹⁵ see Brown (2001), p. 98

⁹⁶ see Brown (1997), p. 3

⁹⁷ see Leibfried/Mcnair (1996), p. 13f

2.4 Characteristics of Benchmarking in the E&P Industry

The previous chapters explained the topics strategic management, performance indicators, and benchmarking in a very general way. This chapter will go into details with the special characteristics of performance indicators and benchmarking in the exploration and production (E&P) industry.

In the past, the amount of acreage and the owning of the latest and newest technology were interpreted as success factors, but the low oil price during the 1990's and a hard competitor-ship forced the companies to reconfigure their definitions and indicators. Today it is possible to find nearly 1000 indicators at www.herold.com.⁹⁸

For a further explanation and introduction of benchmarking to the E&P business, the XEROX benchmarking-process was adopted, because this thesis only covers the first two main parts, the planning, and the analysis, respectively the first five steps of the benchmarking process (see Fig.7).

Like in every business, it is also necessary to find the functions that should be taken under consideration for a benchmarking process. Besides the "usual" financial indicators like earnings before interest and taxes (EBIT), the capital expenditures (CAPEX), and the returns on average capital employed (ROACE) there exist some indicators that are typical for the E&P business. These indicators are the proven oil and gas reserves, the annual oil and gas production, the relation between the former named indicators, the production and the finding costs. Because of the duty of publication of these indicators for example in annual reports, information about these indicators is available and so it is possible to benchmark them. A limitation of the financial performance indicators are the influence of the crude oil and natural gas prices. These prices are market dominated and speculates have a big influence too. The international petroleum companies do only have limited possibilities to influence the development of the crude oil prices although these prices have a direct influence to the performance and profitability. These prices and stock prices are more influenced by politics or organisations like the OPEC or state owned companies like the Russian Gazprom. A company can only influence its profitability by controlling its costs.

Another important indicator is the reserves. This indicator is important related to the growth of a company. But the topic reserves is a very complicated one because of the different ratings like proved reserves, unproved reserves and proven undeveloped reserves. The explanations and definitions of the reserves types are described in the glossary. Technical improvements and innovations may change the ratings of a company within a year.

For the existence of a petroleum company and for a long-term strategy, reserves and their replacement are of high importance. This can be seen at the mergers and acquisitions that were done in the last years. Since it become harder and more expensive to find new reservoirs of interest, the former named options become interesting for the petroleum industry. To underline this thesis see chapter 3.

If the topics that should be benchmarked are identified and defined, the next step that must be taken is the identification of benchmarking partners. As already mentioned this can be done in two ways. The first one is the search after companies that have the same function, services or output, even if the benchmarking partners are not in the same branch.

⁹⁸ see Konzelmann (2006), p. 13ff

Another possibility is the definition of peer groups. Members of these peer groups may be companies of the same size, same area of interest or a similar organisation structure (like the E&P peer group defined by OMV).

The phase of planning is finished if the composition of the data is defined and the data is collected. The composition of data means the sources of the collected data like annual reports, databases, or direct communication with the benchmarking partners.

The planning phase follows the analysis (like done in chapter 3). The phase of analysis should show the possible negative or positive gap in a company's performance. This determination of the performance gap can be done mathematically or it can be seen with the help of graphs. For the E&P industry, the visualisation with the help of histograms could be useful. This allows a quick look on possible gaps respectively a look at the company's position related to its competitors.

The fifth step, the estimation of the future effectiveness, is the result of the former analysis. This analysis allows a deeper look at the functions of the companies, and so it should be possible to identify the best practice and to integrate these results within the own company. The practical execution is done in the following chapters.

3 Analysis of the Data

This chapter is dedicated to the descriptive analysis of the former defined performance indicators. The data used for this analysis was gained from the companies' annual reports and from papers of consulting companies and companies like John S. Herold or PFCEnergy.

The definition which performance indicators should be used for the following analysis was done with the help of several meetings with the advisors of this diploma thesis. The first step was, to find a source for operational and financial indicators, which are used in the petroleum industry. A helpful source was the homepage of John S. Herold with nearly thousand performance indicators. With the help of the advisors of the OMV Austria and the Department of Economics, several indicators were identified during a workshop. After the check of the availability of data for these indicators, a second workshop followed and the advisor of the OMV Austria identified following ten operational and economical performance indicators, to be analysed:

- Earnings before Interest and Taxes (EBIT), USD million
- Earnings before Interest and Taxes per boe (EBIT/boe), \$/boe
- Capital Expenditures (CAPEX), USD million
- Capital Expenditures per boe (CAPEX/boe), \$/boe
- Return of Average Capital Employed (ROACE), %
- Total Oil and Gas Production, Mmboe/yr
- Total Proven Oil and Gas Reserves, Mmboe/yr
- Reserves/Production
- Finding Costs, \$/boe
- Production Costs, \$/boe

3.1 Description of the Performance Indicators

There are two types of performance indicators, which are of interest for this thesis. These indicators are the absolute and the relative ones. An absolute performance indicators can be numbers, sums, or differences like the earnings before interests and taxes (EBIT) or the capital expenditures (CAPEX). A relative performance indicator is a relative number where two absolute indicators stand in relation to one another. Such relative indicators are the productivity, the profitability, or the liquidity.

The earnings before interest and taxes (EBIT) is an absolute performance indicator. It is a measure of a company's earning power from ongoing operations, equal to earnings before deduction of interest payments and income taxes. The EBIT excludes income and expenditure from unusual, non-recurring, or discontinued activities, and it represents the amount of cash a company will be able to use to pay off creditors. The EBIT is also called operating profit. As a result, it is possible to compare the operational profit of different companies directly without the risk, that the results are influenced or distorted by interests,

taxes or other extraordinary factors. The EBIT is influenced both by the upstream and the downstream.⁹⁹

The earnings before interest and taxes per barrel of oil equivalent (EBIT/boe) is a relative performance indicator. It shows the relation between the operating profit per year and the annual oil and gas production.

The total annual oil and gas production is an absolute performance indicator and is the sum of the produced hydrocarbons within a year.

The annual proven oil and gas reserves is an absolute performance indicator and is the sum of proven hydrocarbons of an exploration and production company.

The reserves versus production ratio is a relative performance indicator. It is the relation between the total proven oil and gas reserves and the total annual oil and gas production. The result shows the average years of remaining production.

The capital expenditures (CAPEX) is an absolute performance indicator. It is the money spent to acquire oil or gas fields, or companies, or to upgrade physical assets such as buildings and machinery. This tends to be a very large expense for companies with significant manufacturing facilities, and usually much less of an expense in the services sector. The CAPEX are expenditures creating future benefits.¹⁰⁰

The capital expenditures per barrel of oil equivalent (CAPEX/boe) is a relative performance indicator and shows the relation between the invested money and the annual oil and gas production.

The return on average capital employed (ROACE) is a relative performance indicator and shows the profitability of a company. It is the most common financial indicator for the international oil and gas industry. The ROACE is a financial measure of the profit generated on the total capital invested in the company before any interest expenses are payable to lenders and it is net of any tax effect. It is calculated by the net operating profits after taxes (NOPAT) divided by the average capital employed.¹⁰¹

The “finding costs” is a relative performance indicator and is defined as total exploration expenses divided by changes in proven reserves (extensions, discoveries and revisions of previous estimates). It is the per-barrel costs of adding oil or gas proved reserves.¹⁰²

The “production costs” is a relative performance indicator and is defined as the costs of material and personnel during production excluding royalties. It is the per-barrel costs, associated with the extraction of mineral reserves from a producing property.¹⁰³

⁹⁹ see Investorwords, 2008

¹⁰⁰ see Investorwords, 2008

¹⁰¹ see Röhrenbacher, 2006

¹⁰² see OMV, Annual Report 2006; Energy Information Administration, 2008

¹⁰³ see OMV, Annual Report 2006; Energy Information Administration, 2008

3.2 Development of the average Crude Oil Price

At the beginning, the oil price will be discussed because it has a major impact on the earning and performances of all of the discussed oil companies. The changes of the nominal crude oil price of the two main traded and benchmarked crude oil grades see in Tab. 8, and graphically in Fig. 10.

Year	Brent ¹⁰⁴ (USD/bbl)	Increase (%)	"WTI" ¹⁰⁵ (USD/bbl)	Difference (\$)
2002	24.98	7.00	26.16	1.18
2003	28.84	15.00	31.06	2.22
2004	38.22	32.70	41.47	3.25
2005	54.38	42.00	56.70	2.32
2006	65.14	19.40	66.25	1.11

Tab. 8: Average nominal Crude Oil Price

Tab. 8 shows the nominal values of a barrel crude oil of the grade Brent and of the grade West Texas Intermediate (WTI) the period 2002 until 2006. The third column shows the increase of the nominal Brent crude oil price in percentage per year. The fifth column shows the monetary difference between the grade Brent and WTI per year.

The nominal value for Brent is taken, because the different oil companies in Europe like the CEE companies and the BG Group use this value for calculation of their revenues and incomes, while the American and Canadian Companies deal with the average crude oil price of WTI.

Fig. 10 shows the graphical performance of the two different crude oil grades that are used for calculation of the different oil and energy companies.

The oil price of both grades rose continually in the last years for more than 250 percent. The main reasons for this continuous increase of the crude prices were mainly psychological driven.¹⁰⁶

The world demand, which edged up by 0.5 percent, the strike in Venezuela and the likelihood of a military operation in Iraq influenced the prices in the year 2002.¹⁰⁷

In 2003, the rise in world demand of 2.1 percent, the intervention in Iraq and political turbulences of oil exporting countries were the main drivers for the still increasing Brent and WTI oil prices.¹⁰⁸

The year 2004 was under the impression of a higher demand of crude oil especially in Asia. Market fundamentals such as the low US-dollar exchange rate, unexpectedly strong demand, and shrinking OPEC spare capacity largely concentrated in Saudi Arabia were the underlying factors behind high prices. Still psychological influences, including the instability in Iraq, Nigeria, and Venezuela and the changes at the Russian Yukos group also helped to drive the oil prices to unprecedented heights.¹⁰⁹

¹⁰⁴ see OMV, Annual Report ZAPO 2006

¹⁰⁵ see Petro-Canada, Annual Report 2006

¹⁰⁶ see OMV, Annual Report Konzern 2003, page 22

¹⁰⁷ see OMV, Annual Report Konzern 2002, p. 20

¹⁰⁸ see OMV, Annual Report Konzern 2003, p. 22

¹⁰⁹ see OMV, Annual Report Konzern 2004, p. 23

The year 2005 was a year of an extraordinary hurricane season. Two destructive hurricanes, Katrina and Rita, shot down the production in the Gulf of Mexico and the refineries in this area. This again led to higher crude oil price.

In 2006, the world demand rose again for one percent especially in Asia and in the Middle East. Worries about a new hurricane season, the Lebanon conflict, and the Iran nuclear program were the key-drivers for another annual rising of the oil price.¹¹⁰

The former named reasons of the development of the crude oil prices had also effects on the performance indicators of the petroleum industry. The increasing prices on the world market were advantageous but also brought some disadvantages.

The positive impact was that the financial performances of the oil companies especially the revenues, sales and profits highly increased. Nearly every company, private or state-owned, made high profits with the high oil price. Another positive effect was that the companies had enough money for investments or modernisations. Although there is no causal connection between high oil prices, high profits, and large investments the following analysis showed a continuous increase of the capital expenditures of the oil companies.

On the other hand, every company had to face an increase of costs for services and exploration. This development had an impact on indicators like the finding costs or the production costs. The increase of finding costs is given by higher costs for equipment, more offshore activities, and higher needed investments for reservoirs that would not be of interest with a low oil price. The high production costs resulted of the fact that higher investment for the mature fields was necessary and that the costs for services of the service companies and contractors increased.

Finally, it is possible to say that a high oil price enabled the oil companies to invest their profits to increase their production and their amount of reserves. This enabled the oil companies to a long-term survival and expectant profits.

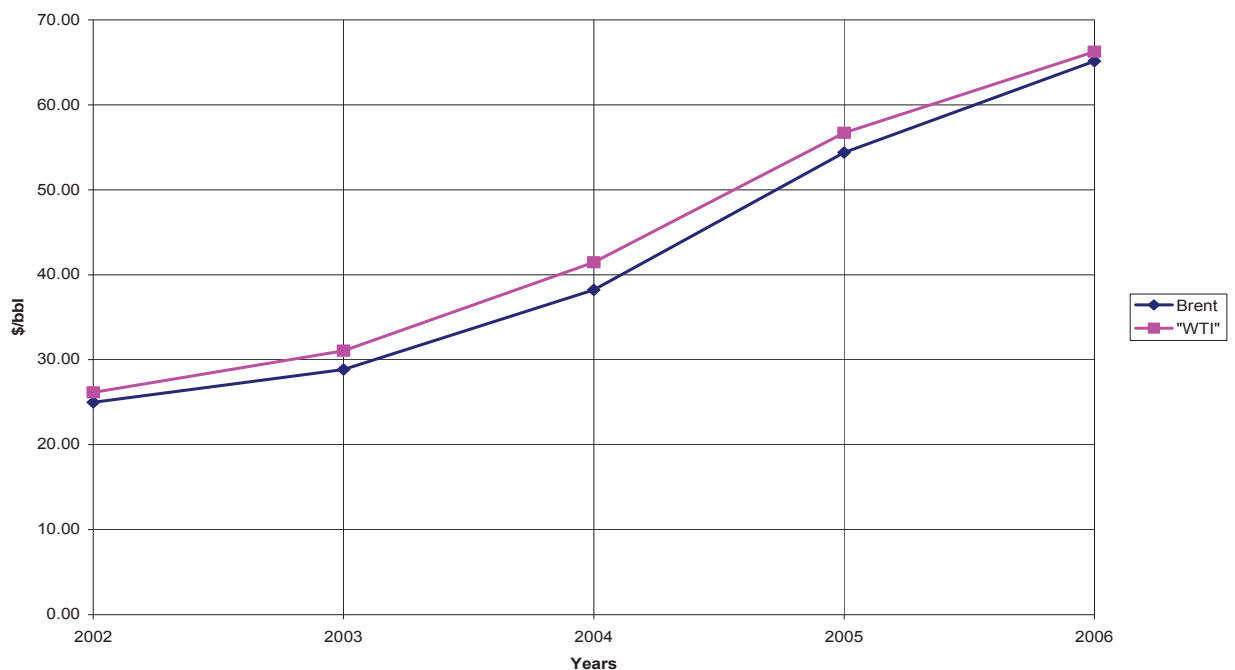


Fig. 10: Average nominal Crude Oil Price for Brent and “WTI”

¹¹⁰ see OMV, Annual Report 2006, p. 34

3.3 Analysis of the Central Eastern Europe Companies Data

After the avocation with the theoretical fundamentals of strategic controlling, the meaning of performance indicators and benchmarking, a meeting with Dr Paul, of the OMV and DI Friess, of the Department for Economics followed to define the countries of interest for the benchmarking with the competitors in the Central Eastern Europe (CEE) area.

The following countries of the CEE were defined as area of interest:

Albania, Austria, Croatia, the Czech Republic, Hungary, Poland, Romania, the Slavic Republic, Slovenia, and Yugoslavia

With the help of the World Wide Web and relevant journals, it was possible to find several oil companies in these countries that could be of interest and that could be compared to the OMV Austria Exploration & Production GmbH. The criteria for selection were the size, the business areas, and the core activities.

The names of the companies that were found are listed below:

Albania	AlbPetrol
Austria	OMV Rohöl-Aufsuchungs Gesellschaft (RAG)
Croatia	Industrija Nafta d.d. Zagreb (INA)
Czech Republic	Moravské Naftové Doly, a.s. (MND)
Hungary	Hungarian Oil & Gas Company Plc (MOL)
Poland	PGNiG PKN Orlen PetroBaltic Nafta Polska
Romania	Petrom RomPetrol RomGaz
Slovak Republic	Nafta Gbely Slovensky Plynarensky Priemysel (SPP)
Slovenia	Petrol
Yugoslavia	NIS

The problem was to gain information about each of the companies. About some of the companies, no valuable data was accessible, or the companies were not of interest for the benchmarking process because their core activities were not the same like these of the OMV. An example is the Slovensky Plynarensky Priemysel, which is only active in the gas distribution sector and has no own E&P segment.

For the indicators mentioned at the beginning of chapter 3 it was possible to find sufficient data and information concerning the remaining CEE companies. These remaining companies are the Hungarian MOL, the Croatian INA, the Romanian Petrom, and the Austrian OMV.

For the other oil companies in Central Eastern Europe no useful and predicative data were available. Therefore, it was necessary to concentrate only on the previously named companies to find helpful data and information to reach a qualified analysis and benchmark for the years 2002 to 2006.

Beside the International OMV Group, the subsidiary OMV Austria was included in the benchmarking process. The comparison of some of the indicators between OMV Austria and the other companies is limited because the OMV Austria is only a subsidiary of the OMV Group.

Another problem is that not all data sets are complete, because some of the companies changed the content of their annual reports year-by-year or they did not published any data and other sources like John S. Herold or PFCenergy delivered no additional information.

3.3.1 Overview over the Central Eastern Europe Companies

The OMV Group is an integrated European oil and natural gas corporation with its residence in Vienna. OMV is the largest listed industrial company in Austria. The core segments of the company include refining and marketing including petrochemicals, exploration and production and gas. Exploration and production activities take place in 19 countries on four continents. The OMV is also engaged in the distribution sector with filling stations in 13 countries. Since 2005, the company owns 51 percent of the Romanian oil company Petrom.¹¹¹

Petrom is the largest Romanian oil and gas group, with activities in the exploration and production, refining, petrochemicals and marketing. Exploration and production activities take place in Romania, Kazakhstan, and Russia.¹¹²

INA is a state-owned Croatian oil company with its headquarter in Zagreb. The company is a medium-sized European oil company with a leading role in the oil industry in Croatia and a significant role in the region. The core business segments are the oil and gas exploration and production, oil and gas processing and oil and gas products distribution. Exploration and production is primary done onshore and offshore within Croatia but also in Angola, Egypt, Syria, and Namibia. In 2004, the Hungarian MOL became a strategic partner.¹¹³

MOL is an integrated Hungarian oil and gas company. The core activities of the group include exploration and production of crude oil, natural gas, and gas products, refining and transportation, storage and distribution of crude oil products. MOL is market leader in each of their core activities in Hungary and Slovakia. Areas of interest and assets are Hungary, Russia, Kazakhstan, Pakistan, Yemen, and Oman. Since 2004, the company owns 25 percent and one share of the Croatian INA.¹¹⁴

¹¹¹ see OMV, 2007

¹¹² see Petrom, 2007

¹¹³ see INA, 2007

¹¹⁴ see MOL, Annual Report 2006

3.3.2 Development of the Earnings before Interest and Taxes

This chapter is dedicated to the analysis of the development of the earnings before interest and taxes (EBIT) of the Central Eastern Europe (CEE) peer members. The definition and description of the EBIT is shown in chapter 3.1.

Tab. 9 shows the development of the EBIT during the period from 2002 to 2006. As in chapter 3.1 already mentioned had the increasing price for crude oil a major impact on the revenues and accordingly on the EBIT, but it was influenced negative by a strong Euro to a weakening USD. The exchange rate between Euro and USD developed from EUR/USD 0.95 in 2002 to EUR/USD 1.256 in 2006.¹¹⁵

EBIT, \$MM	2002	2003	2004	2005	2006
OMV Group ¹¹⁶	470.25	727.72	1150.09	2435.75	2588.62
OMV Group*	470.25	727.72	1150.09	1710.64	1367.35
Petrom ¹¹⁷	86.43	140.48	199.95	606.22	1081.55
INA ¹¹⁸	100.00	205.71	298.51	279.43	278.00
MOL ¹¹⁹	328.11	374.81	1352.10	1437.50	1748.40
OMV Austria ¹²⁰	182.68	184.63	151.45	270.38	329.50
Peer Average	233.49	326.67	630.42	860.83	960.96

Tab. 9: Earnings before Interests and Taxes in USD Million

The data of OMV Group* is without the impact of the Romanian Petrom.

Fig. 11 shows a correlation between the EBIT and the nominal crude oil price. The graph shows that there is a context between the rising crude oil prices and the increasing EBIT of the companies.

¹¹⁵ see OMV, Annual Report ZAFO 2006, p. 9

¹¹⁶ see OMV, Annual Reports 2002 – 2006

¹¹⁷ see Petrom, Annual Reports 2002, 2004, 2005, 2006

¹¹⁸ see INA, Annual Reports 2002 – 2006; Herold Database, 2007

¹¹⁹ see Herold Database, April 2007

¹²⁰ source OMV Austria

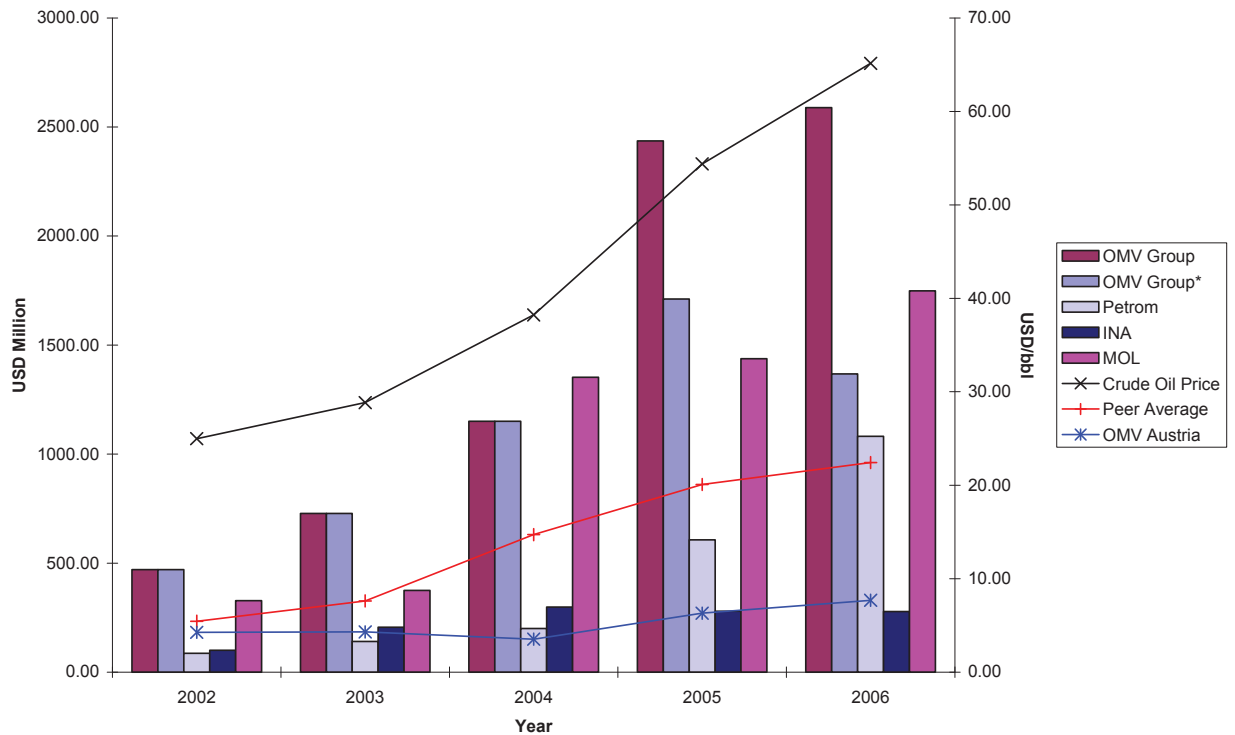


Fig. 11: EBIT in USD Million versus Time

The definition and description of the earnings before interest and taxes per barrel of oil equivalent (EBIT/boe) is found in chapter 3.1. The result of this relation is shown in Fig. 12.

EBIT/boe	2002	2003	2004	2005	2006
OMV Group	15.47	16.69	25.06	19.75	21.86
OMV Group*	15.47	16.69	25.06	37.72	30.16
Petrom	1.06	1.74	2.46	7.78	14.80
INA	4.65	10.45	16.23	14.23	13.07
MOL	10.16	10.33	36.57	39.15	46.69
OMV Austria	12.95	12.80	10.57	19.79	23.52
Peer Average	8.86	10.40	18.18	23.73	25.65

Tab. 10: EBIT divided by the annual Production Rate

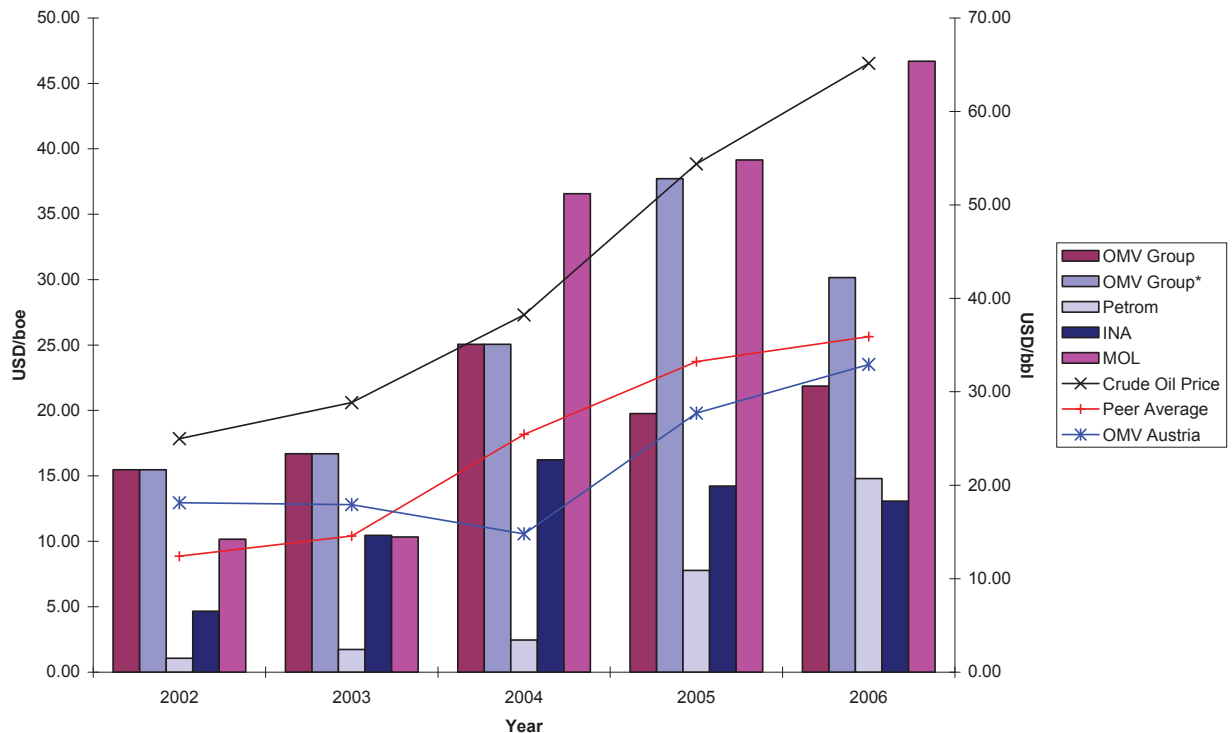


Fig. 12: EBIT/boe in USD/boe Production versus Time

The Development of the individual Companies

The worst refining margins for over a decade, the crude oil price, and a weak USD had a major impact on the overall earnings of the oil companies worldwide.

The Austrian OMV cautioned this negative trend by controlling their costs and so in 2002 it was possible to bring in the second best EBIT in the company's history. This was possible because of higher crude oil prices, an increase of the world demand and a 43 percent growth of production.¹²¹ The year 2003 brought a new increase of the EBIT. Higher oil and gas prices and a strengthening of the refining margins made this possible.¹²² In 2004, the EBIT rose again for 44 percent (see Fig. 12). A large impact had the acquisition of the Romanian Petrom, which leads to a doubling of the OMV Groups size.¹²³ The key role of the high EBIT of 2005 played the Romanian Petrom with additional USD 1000 million for the group's results.¹²⁴ 2006 was again a very successful year for OMV. The entry in one of Europe's greatest growth markets with the acquisition a share of the leading Turkey oil marketing company Petrol Ofisi enabled a new growth of the company and of the EBIT.

Romanian Petrom's 2002 EBIT was mainly driven by the increasing prices for crude oil and natural gas on the international markets.¹²⁵ The year 2005 was very successful for Petrom. The EBIT increased for more than 300 percent related to 2004 (see Tab. 9). This increased resulted from the increase of the result of the E&P as well as of the refining

¹²¹ see OMV, Annual Report OMV AG 2002, p. 6

¹²² see OMV, Annual Report OMV AG 2003, p. 11

¹²³ see OMV, Annual Report Konzern 2004, p. 2

¹²⁴ see OMV, Annual Report Konzern 2005, p. 3

¹²⁵ see Petrom, Annual Report 2002, p. 41

segment.¹²⁶ In 2006, the EBIT increased for nearly 180 percent. The main driver for this increase, were higher oil and gas prices, improved margins in the refining segment and a growth of sales.¹²⁷

In 2002 started the privatisation of the state owned Croatian INA. During this privatisation period, the management started restructuring measures including streamlining of core operations, cost reduction, and spinning off other non-core businesses, which led also to good business results.¹²⁸ The year 2003, which was a very successful for INA, was marked by high investments in the refining sector and in the exploration and development operations especially in the North Adriatic. In addition, the strategic partnership with the Hungarian MOL, which purchased 25 percent plus 1 share, strengthened their position.¹²⁹ The aim to improve performance of each business segment and to grow in the regional market was rewarded by a net profit growth in the year 2004 of nearly 45 percent compared the preceding year.¹³⁰ 2005, was mainly driven by the high crude oil prices, but stable refining margins and a low growth of oil products in the Croatian market led to an increase of INA's EBIT.¹³¹ The renewed decrease of the EBIT in 2006 was caused by capped natural gas prices, lower refining margins, and regulatory changes in the Croatian market, which limited maximum prices.¹³²

For the Hungarian MOL the year 2002 was determined by the result of their 3-years strategy, which they defined in 1999. Parts of this strategy were the refocus and restructuring of their core activities and the divestiture of non-core businesses. This led to a marginal increase of the EBIT compared to the years before.¹³³

Like the other companies in 2003, MOL profited of the high crude oil prices and the good refining margins. The highest impact in the risen EBIT of this year had the reduction of their headcount as part of their restructuring measures.¹³⁴ Remarkable is the step of Hungarians MOL from 2003 to 2004. The favourable industrial environment, like the high crude oil price, better refining margins than in the past and the weakening USD made this result possible. In addition, the synergy effects with the Croatian INA, cost reduction programs, successful domestic exploration that helped to raise the domestic crude production by eight percent over the year and a positive change in the domestic market growth made the large increase of their EBIT possible¹³⁵. In 2005, the focused growth strategy, which was formulated in 2002, showed its full effect. The investments in the upstream and downstream businesses, improved efficiency, and the successful integration of MOL's subsidiaries led the company to an again risen EBIT.¹³⁶ The main driving force of 2006 result was the petrochemical sector with its strong growth of demand across the region, both in Hungary and Slovakia.¹³⁷

¹²⁶ see Petrom, Annual Report 2005, p. 63

¹²⁷ see Petrom, Annual Report 2006, p. 55, p. 74ff

¹²⁸ see INA, Annual Report 2002, p. 11

¹²⁹ see INA, Annual Report 2003, p. 12

¹³⁰ see INA, Annual Report 2004, p. 15

¹³¹ see INA, Annual Report 2005, p. 12

¹³² see INA, Annual Report 2006, p. 17

¹³³ see MOL, Annual Report 2002, p. 3; Herold Database, 2007

¹³⁴ see MOL, Annual Report 2003, p. 4

¹³⁵ see MOL, Annual Report 2004, p. 4f

¹³⁶ see MOL, Annual Report 2005, p. 1f

¹³⁷ see MOL, Annual Report 2006, p. 8

General Trends and the Dependence on the Oil Price

The economical environment of the CEE peer member was approximately the same. In Fig. 11, the development of the EBIT for the individual CEE peer members and the development of the crude oil price is shown. A correlation of the crude oil price to the average EBIT shows that an increasing oil price results in an increasing EBIT. The graph of the EBIT per boe (see Fig. 12) underlines this development. The general trends that support the increasing EBIT are acquisitions or the completions of strategic alliances and the improvement of performance in the single business segments.

3.3.3 Development of the total annual Oil and Gas Production

For the description of the total annual oil and gas production, see chapter 3.1.

The aim of every oil company is to increase their oil production to higher their sales, if the oil price has a high level. During times of a low crude oil price, the production is also on a low level. The reason is, the support of supply and demand to gain higher crude oil prices and then to increase production to gain higher sales. How the annual production rate of the OMV Group, OMV Austria, the Croatian INA, the Hungarian MOL, and the Romanian Petrom developed in the last years is shown in Tab. 11.

Total Oil & Gas Production, Mmboe/yr	2002	2003	2004	2005	2006
OMV Group ¹³⁸	30.40	43.60	45.90	123.30	118.40
OMV Group*	30.40	43.60	45.90	45.35	45.34
Petrom ¹³⁹	81.42	80.73	81.31	77.95	73.06
INA ¹⁴⁰	21.5	19.68	18.39	19.64	21.27
MOL ¹⁴¹	32.30	36.28	36.97	36.72	37.45
OMV Austria ¹⁴²	14.11	14.42	14.33	13.66	14.01
Peer Average	35.95	38.94	39.38	38.66	38.23

Tab. 11: Total annual Production in Million boe per Year

The data of OMV Group* is without the impact of the Romanian Petrom.

¹³⁸ see OMV, Annual Report 2006, p. 4

¹³⁹ see Petrom, Annual Reports 2004, 2006; OMV Annual Report 2006

¹⁴⁰ see INA, Annual Reports 2002 – 2006; Herold Database, 2007

¹⁴¹ see MOL, Annual Reports 2002 – 2006

¹⁴² source OMV Austria

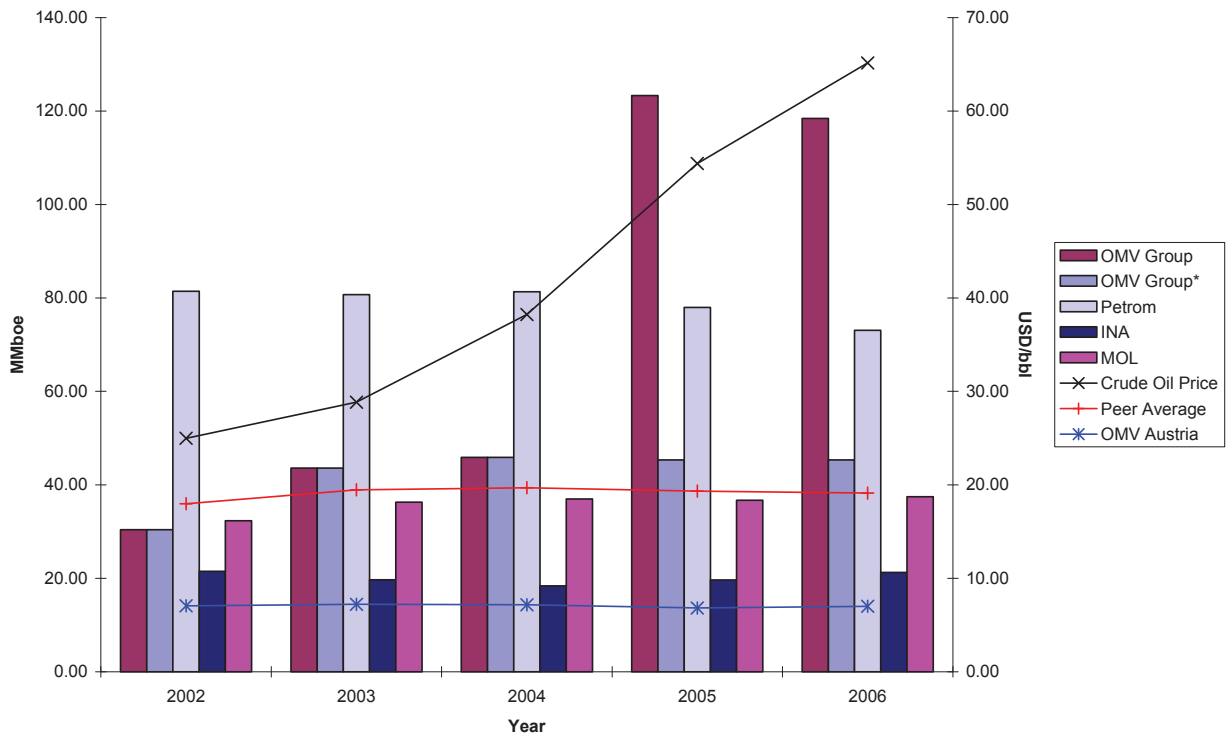


Fig. 13: Annual Production Rate in Million boe versus Time

Every company has to face the same problem, that is, that the domestic reserves decrease because of the increasing production (Fig. 13). To work against the trend all companies make high investments in exploration and development and in enhanced oil recovery methods. They try also to find new areas of interest to increase their volume of hydrocarbons.

The Development of the individual Companies

The increase of production of the OMV Group in 2002 was the result of the acquisition of a 10 percent stake in the Maui oil and gas field offshore New Zealand and the commissioning of oil fields in UK waters and the start of full production in Pakistan.¹⁴³ In 2003 the acquisition of the German Preussag helped to increase the daily production from 83,000 boe/d in 2002 to 120,000 boe/d in 2003, but also the organic production growth of 19 percent had a major impact.¹⁴⁴ The production could be increased once more in 2004. Organic growth lifted the output by five percent and the Swan gas field in Pakistan went into full production.¹⁴⁵ The year 2004 was also marked by the acquisition of the Romanian Petrom.¹⁴⁶ The result was seen in 2005, when production nearly tripled (see Fig. 13). The decrease of production of the OMV Group was the result of the divestments in Australia. On the other hand, the acquisition of the Romanian Petrom showed their first results with a significant increase in production with additional 217,000 boe/d.¹⁴⁷ As shown in Tab. 11 the annual production decreased in 2006. The main drivers for this development were the

¹⁴³ see OMV, Annual Report 2002, p. 23

¹⁴⁴ see OMV, Annual Report 2003, p. 24

¹⁴⁵ see OMV, Annual Report 2004, p. 29

¹⁴⁶ see OMV, Annual Report 2004, p. 3

¹⁴⁷ see OMV, Annual Report 2005, p. 30 and p. 36

lower output in Romania, divestments of the assets in Qatar and Ecuador, and changes in the contracts with Venezuela.¹⁴⁸

The long-term target of the OMV Group is to produce 500 000 boe/d until 2010.¹⁴⁹

The Romanian Petrom, until 2004 a state owned company, enabled new technologies and the concepts of reservoir management and field rehabilitation. These modernisations led to a decrease of production between 2004 and 2006 but they will show their positive effects in the next coming years.¹⁵⁰

To work against the continuous decline of production of the domestic fields, the Croatian INA started in 2002 with a large amount of work over operations, which lead to success.¹⁵¹ In 2003, the production rate of crude oil decreased while the production rate of natural gas increased. This was reached with the modernisation of lifting systems of the gas wells and so the annual production could be increased.¹⁵² Because of increasing exploration risks, exploration in Croatia decline and INA invested capital to explore successful in Syria, Egypt, and Angola. In 2003 INA and the Hungarian MOL became strategic partner and MOL took over 25 percent and 1 share. This strategy of INA persuaded the idea to strengthen their position as leading company in Croatia, Hungary, and Slovakia.¹⁵³

After years of restructuring and refocusing on their core businesses, the Hungarian MOL was able to slow down the natural decline in the domestic production. A joint venture in 2002 with the Russian oil company Yukos and investments in existing explorations in Yemen and Pakistan helped to hold production and the volume of reserves. In 2004, MOL decided to focus new on CIS country and started investment in Russia and Kazakhstan. Although the annual production in 2005 continued to stay stable because of new fields were put into operation in Hungary and Pakistan, the annual crude oil production continued its steady decline.¹⁵⁴ In 2006, MOL was fully privatised and with the purchase of the Russian oil company, BalTex, the proven and probable reserves could be increased, which will be effects on the future production.¹⁵⁵

In 2002, 46 percent of the total production of the OMV Group comes from Austria. In the years 2002 and 2003, the high level of production could be maintained by successful drilling and work-over campaigns.¹⁵⁶ The output of the OMV Austria in 2004 was possible by an intensive drilling campaign and enhanced recovery methods, which kept the production rate close to the last year result.¹⁵⁷ In 2005, the annual production of the OMV Austria decreased. Reason for this was the scheduled shutdown for technical inspection at the sour gas plant in Aderklaa.¹⁵⁸ As shown in Fig. 13 the OMV Austria was able to increase production from 37,400 boe/d in 2005 to 38,400 boe/d in 2006.¹⁵⁹

¹⁴⁸ see OMV, Annual Report 2006, p. 38

¹⁴⁹ see OMV, Annual Report 2004

¹⁵⁰ see Petrom Annual Reports 2004 - 2006

¹⁵¹ see INA, Annual Report 2002, p. 24

¹⁵² see INA, Annual Report 2003, p. 30f

¹⁵³ see INA, Annual Report 2003; MOL, Annual Report 2003

¹⁵⁴ see MOL, Annual Report 2005, p. 10f

¹⁵⁵ see MOL, Annual Report 2006

¹⁵⁶ see OMV, Annual Report 2002 p. 3,23; 2003 p. 26

¹⁵⁷ see OMV, Annual Report 2004, p. 30

¹⁵⁸ see OMV, Annual Report 2005, p. 36

¹⁵⁹ see OMV, Annual Report 2006, p. 38

General Trends and the Dependence on the Oil Price

The premise that an increasing crude oil price leads to increasing production is not valid for the CEE peer group. All companies have the problem of the maturity of their domestic fields and therefore in the average with decreasing production rates (see Fig. 13). To soften this trend, every company invest a lot of money in exploration, enhanced oil recovery (EOR) and modernisation activities. Because of the maturity of the domestic fields and the therefore resulting exploration risks, the companies tend to invest their capital abroad into their existing assets or new areas of interest.

3.3.4 Development of the total proven Oil and Gas Reserves

The definition and description of the total proven oil and gas reserves see chapter 3.1. The increase in reserves is a sign, that the company follows a successful strategy to consolidate its position in the market.

The change with time of the total proven reserves is graphically shown in Fig. 14. The large increase of proved reserves of the Austrian OMV in 2005 is caused by the acquisition of the Romanian Petrom (see Tab. 12).¹⁶⁰

Total Proved Oil & Gas Reserves, Mmboe	2002	2003	2004	2005	2006
OMV Group ¹⁶¹	343.10	410.10	384.40	1364.60	1289.30
OMV Group*	343.10	410.10	384.40	373.84	348.89
Petrom ¹⁶²	/	/	1024.53	990.76	940.41
INA ¹⁶³	236.52	222.31	252.12	257.09	261.10
MOL ¹⁶⁴	274.90	269.00	310.60	290.00	331.60
OMV Austria ¹⁶⁵	155.90	152.30	148.65	150.50	146.80
Peer Average	252.61	263.43	424.06	412.44	405.76

Tab. 12: Total proven Oil and Gas Reserves in Million boe

The data of OMV Group* is without the impact of the Romanian Petrom.

¹⁶⁰ see OMV, Annual Report 2005

¹⁶¹ see OMV, Annual Report 2006

¹⁶² see Petrom, Annual Reports 2004 – 2006; OMV Annual Report 2006

¹⁶³ see INA, Annual Reports 2002 – 2006

¹⁶⁴ see MOL, Annual Reports 2002 – 2006

¹⁶⁵ source OMV Austria

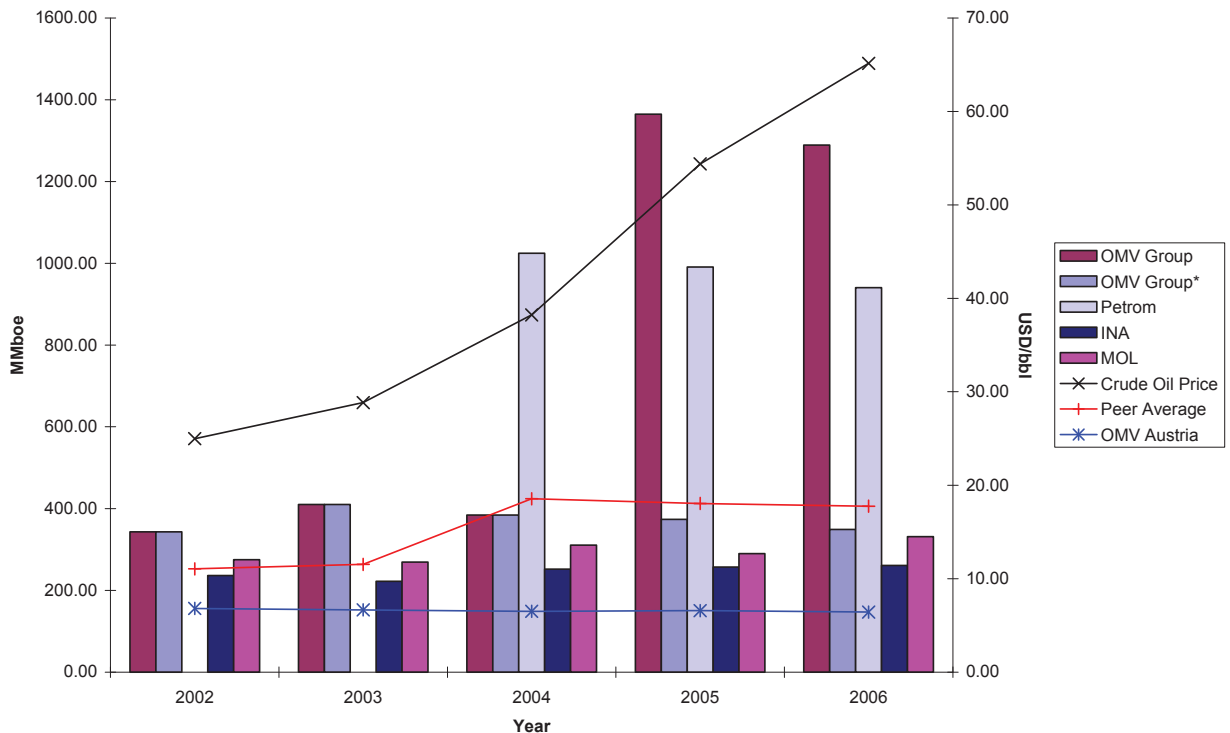


Fig. 14: Total proven Oil and Gas Reserves in Million boe

The Development of the individual Companies

In 2002, new discoveries and upgrading of reserves estimations in Libya and Austria accounted for the additions in reserves.¹⁶⁶ The increase of reserves in 2003 was mainly driven by the acquisition of the German oil company Preussag.¹⁶⁷ In 2004, new reserves were caused by the acquisition of the Romanian Petrom. They were added to OMV's portfolio on December 14, 2004 and are not included in the interpretations for this year.¹⁶⁸

Unfortunately, no data was available for the Romanian Petrom for the years 2002 and 2003. The decrease of reserves in the following years is the result of higher production rates to reach OMV's target for 2010 of 500,000 bbl/d.¹⁶⁹

High investments in enhanced oil recovery (EOR) and exploration abroad helped the Croatian INA to increase their volume of reserves. More than 95 percent of the reserves are domestic reserves and therefore high capital investments for modernisation, development and in EOR were done in the homeland. In 2005, successful exploration in Syria led to additional volumes of reserves.¹⁷⁰

In 2002, the Hungarian MOL had revisions that resulted in a decline of reserves of 13.9 million boe compared to 2001. In 2003, the reserves of the domestic net proven oil and gas

¹⁶⁶ see OMV, Annual Report 2002, p. 25

¹⁶⁷ see OMV, Annual Report 2003, p. 25

¹⁶⁸ see OMV, Annual Report 2004, p. 29

¹⁶⁹ see Petrom, Annual Reports 2004 – 2006; OMV, Annual Report 2006

¹⁷⁰ see INA, Annual Reports 2002 – 2006

reserves of the Hungarian MOL sank because of the higher annual production. Domestic exploration and field revisions resulted in a growth of the reserves (1.1 percent for crude oil; 8.6 percent of natural gas) but this was too less and so the net proven reserves declined by 7.9 percent.¹⁷¹ In the following year, the reserves increased again because of an increase in the Russian oil reserves and through field development results. In 2005 once more, the reserves declined because of negative revisions on certain Hungarian fields. The acquisition of the Russian oil company, BalTex, in 2006 increased the proven reserves of the Hungarian MOL.¹⁷²

In 2002, an intensive drilling program led to new discoveries and therefore to an expansion of the known reserves of OMV Austria.¹⁷³

General Trends and the Dependence on the Oil Price

The average trend curve of the CEE peer members shows a continuous decline of total proven oil and gas reserves until 2004. The increase in 2004 is caused by the introduction of Petrom into the analysis but since then the amount of reserves decreased again. None of the companies was able to hold their amount of reserves, although they invest a lot into exploration, development, modernisation, work over, and enhanced oil recovery (EOR) both in their domestic fields and abroad.

As discussed in chapter 3.2 the rising oil price is also influenced by the decreasing amount of crude oil and natural gas reserves. A look at Fig. 14 may underline this trend.

3.3.5 The Relation between Reserves and Production

This chapter relates the annual production to the total proved reserves. A further description see chapter 3.1. The result of this relation is shown in Tab. 13. It shows how long a company under the existing conditions will be able to produce. It is a measured variable for the possibility of a company to be competitive in the future.

Reserves/Production	2002	2003	2004	2005	2006
OMV Group	11.29	9.41	8.37	11.07	10.89
OMV Group*	11.29	9.41	8.37	8.24	7.69
Petrom	/	/	12.60	12.71	12.87
INA	11.00	11.30	13.71	13.09	12.28
MOL	8.51	7.41	8.40	7.90	8.85
OMV Austria	11.05	10.56	10.37	11.02	10.48
Peer Average	10.46	9.67	10.69	10.59	10.44

Tab. 13: Total proven Oil and Gas Reserves versus total annual Production

¹⁷¹ see MOL, Annual Report 2003, p. 6

¹⁷² see MOL, Annual Reports 2002 - 2006

¹⁷³ see OMV, Annual Report 2002, p. 23

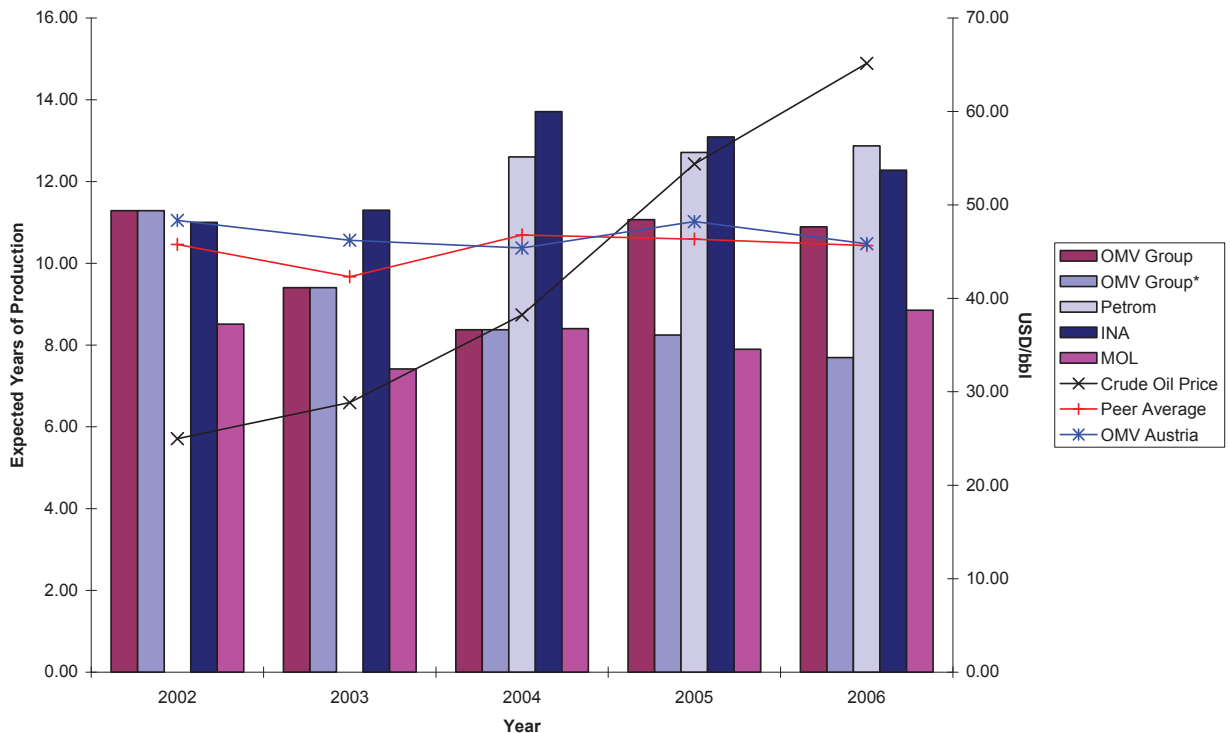


Fig. 15: Ratio between Reserves and Production in expected Years

In the average, every company has 11 years left for production if no more proved reserves or discoveries will be added, or the production rate will be increased or decreased, or significant changes of the oil price will occur that may influence the exploration or production behaviour of the companies.

Changes in the expected years of production will occur, if new explorations will add new volumes of proved reserves, and/or new acquisitions add new proven reserves, and/or revisions will increase the known proved reserves. Changes in the production behaviour of a company e.g. the natural decline of field rates of mature fields will also influence the ratio as well as the development of the prices of crude oil and natural gas.

3.3.6 Development of the Capital Expenditures

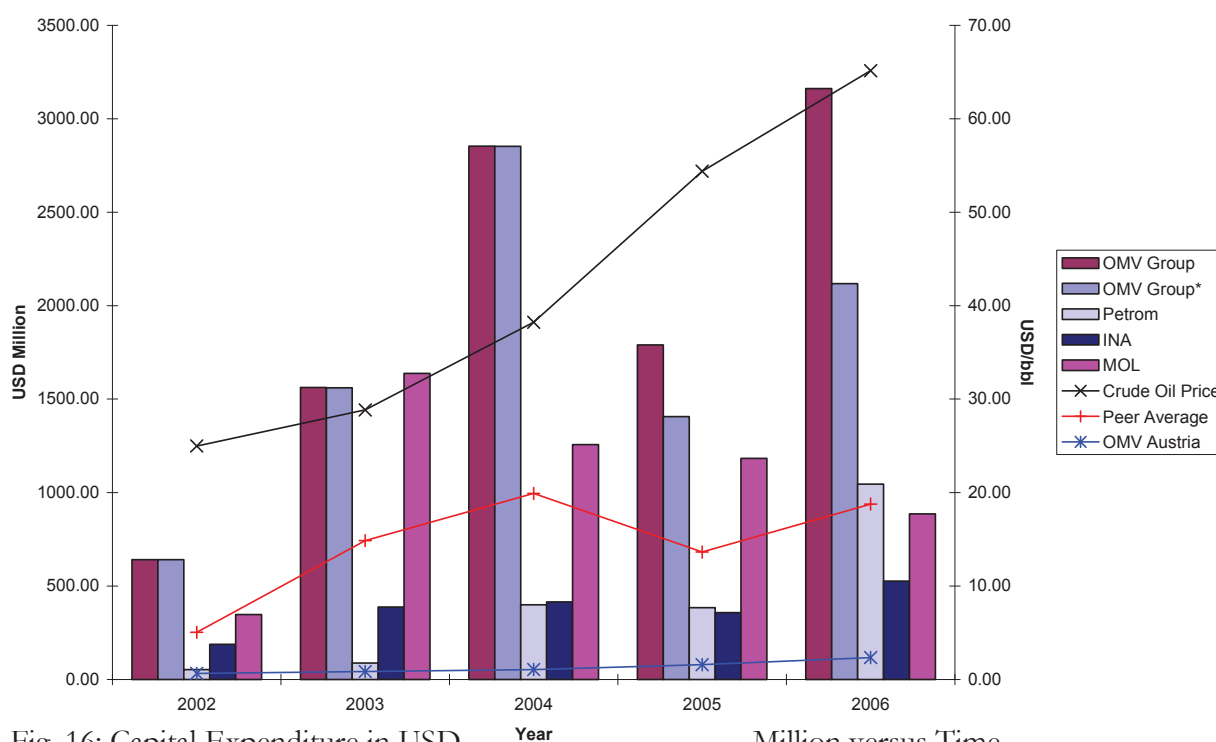
The CAPEX (= Capital Expenditures) is defined as ‘expenditure or investment of a company used to purchase new or upgrade old long-term physical assets, machinery, and other equipment’.¹⁷⁴ They are expenditures creating future benefits. This indicator helps to analyse the investment behaviour of the different companies. In Tab. 14 and Fig. 16, the different companies and their investment activities are shown.

¹⁷⁴ see Capex Definition, 2007

CAPEX, \$MM	2002	2003	2004	2005	2006
OMV Group ¹⁷⁵	641.25	1562.19	2853.10	1790.26	3161.60
OMV Group*	641.25	1560.53	2852.87	1406.27	2117.60
Petrom ¹⁷⁶	53.12	87.69	399.59	383.85	1045.01
INA ¹⁷⁷	188.23	387.25	414.72	358.10	526.41
MOL ¹⁷⁸	347.29	1637.25	1256.17	1183.27	885.99
OMV Austria ¹⁷⁹	32.67	42.59	53.15	79.00	117.22
Peer Average	252.51	743.06	995.30	682.10	938.44

Tab. 14: Capital Expenditures in USD Million

The data of OMV Group* is without the impact of the Romanian Petrom.



Tab. 15 shows the CAPEX in USD divided by the annual production in boe. This indicator displays the investments and spending of a company in relation to the produced hydrocarbons in a year.

¹⁷⁵ see OMV, Annual Report 2006, p. 144

¹⁷⁶ see Petrom, Annual Reports 2002, 2004, 2005 and OMV Annual Report 2006

¹⁷⁷ see INA, Annual Reports 2002 – 2006

¹⁷⁸ see MOL, Annual Reports 2002 – 2006

¹⁷⁹ source OMV Austria

CAPEX, \$/boe	2002	2003	2004	2005	2006
OMV Group	21.09	35.83	62.16	14.52	26.70
OMV Group*	21.09	35.79	62.15	31.01	46.70
Petrom	0.65	1.09	4.91	4.92	14.01
INA	8.76	19.68	22.55	18.23	24.75
MOL	10.75	45.13	33.97	32.23	23.66
OMV Austria	2.32	2.95	3.71	5.78	8.37
Peer Average	8.71	20.93	25.46	18.44	23.50

Tab. 15: Capital Expenditures divided by total annual Production in USD/boe

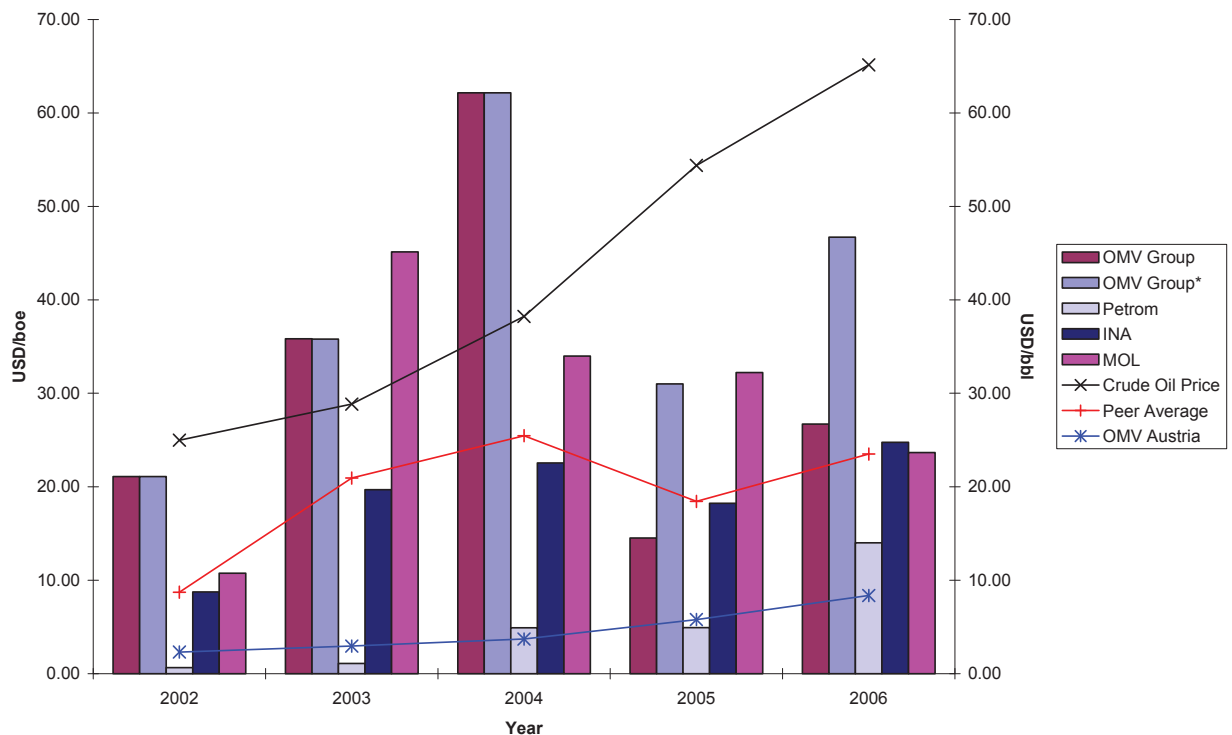


Fig. 17: Capital Expenditures per boe versus Time

The Development of the individual Companies

The increase of OMV's CAPEX in 2002 reflected the acquisitions of stakes in oil fields offshore New Zealand and in the UK waters and development projects in Pakistan, Australia and in the UK.¹⁸⁰ In 2003, the acquisitions of the German companies Preussag and Bayernoil marked the largest take-overs in OMV's history that is why the investment reached such a high level (Fig. 16). The CAPEX of 2004 had the amount of USD 2852.87 mn because of the acquisition of the Romanian Petrom – 66.2 percent of the whole capital expenditures.¹⁸¹ In 2005, the main segments of investment were the E&P sector (390 USD

¹⁸⁰ see OMV, Annual Report 2002, p. 40

¹⁸¹ see OMV, Annual Report 2004

mn), refining and marketing (825 USD mn) and the integration of Petrom (504 USD mn).¹⁸² In 2006, 70 percent of the invested capital was invested in growth projects. The significant increase of the CAPEX in this year was caused by the 34 percent acquisition of the Turkish Petrol Ofisi (1064 USD mn).¹⁸³

In the period from 2002 until 2004, the Romanian Petrom invested most of their capital in exploration projects (~ 40 percent).¹⁸⁴ Until 2005, the times were Petrom became a part of the Austrian OMV Group most of the investments were taken in growth, field development, and restructuring and in the refining sector in modernization projects.¹⁸⁵

Most of the investments and the capital expenditures of the Croatian INA flew into their projects in Syria and in the North Adriatic region. Such as the North Adriatic project is an offshore one, high investments were necessary.¹⁸⁶

In 2003, the high CAPEX of the Hungarian MOL was given by investments to strengthen their regional position and the consolidation of Slovnaft.¹⁸⁷ The following years were marked by large investments in the regional fuel market, in the distribution market and the modernisation of the refineries to meet the stringent EU 2009 quality standards.¹⁸⁸ In 2005, the Group capital expenditures decreased because of lower spending for acquisitions and the completion of the major refinery and petrochemical investments.¹⁸⁹ Once more, the CAPEX decreased in 2006. 'There are three main factors behind the decrease: the cash spent for the ownership of previously state-owned cushion gas and the Shell-Romania acquisition in 2005, and the Russian acquisition of the exploration and production segment of the company BalTex in 2006.'¹⁹⁰

The indicator CAPEX per boe shows how the capital expenditures of each company be reflected in the annual production volume.

As already mentioned before was the peak for OMV because of the acquisition of the Romanian Petrom in 2004. The Austrian OMV took large investments while the production remains the same. The change in the CAPEX per boe is seen in the following year.

General Trends and the Dependence on the Oil Price

After a decrease in 2005, the average CAPEX curve increased again. In general, every company invested their capital into acquisitions and growth projects, whereas these growth projects had, different meanings (e.g. strengthen of the regional position, investments in E&P,...). The correlation of the crude oil price with the behaviour of average CAPEX curve shows that the increasing oil price had a positive influence to the investment behaviours of the companies.

¹⁸² see OMV, Annual Report 2005, p. 60

¹⁸³ see OMV, Annual Report 2006, p. 56

¹⁸⁴ see Petrom, Annual Reports 2002, 2004

¹⁸⁵ see OMV, Annual Reports 2005, 2006

¹⁸⁶ see INA, Annual Report 2003, 2004

¹⁸⁷ see MOL, Annual Report 2003

¹⁸⁸ see MOL, Annual Reports 2004 – 2006

¹⁸⁹ see MOL, Annual Report 2005, p. 34

¹⁹⁰ see MOL, Annual Report 2006, p. 48

3.3.7 Development of the Return on Average Capital Employed

A detailed explanation and description of the performance indicator return on average capital employed (ROACE) is seen in chapter 3.1. The development of the ROACE is shown in the table below (see Tab. 16).

ROACE, %	2002	2003	2004	2005	2006
OMV Group ¹⁹¹	11.00	12.00	15.00	20.00	18.00
Petrom ¹⁹²	11.30	11.20	13.00	22.00	21.00
INA ¹⁹³	8.33	5.54	11.74	9.70	7.19
MOL ¹⁹⁴	10.97	12.65	27.00	27.60	27.20
Peer Average	10.40	10.35	16.69	19.83	18.35

Tab. 16: Return of Average Capital Employed in Percent

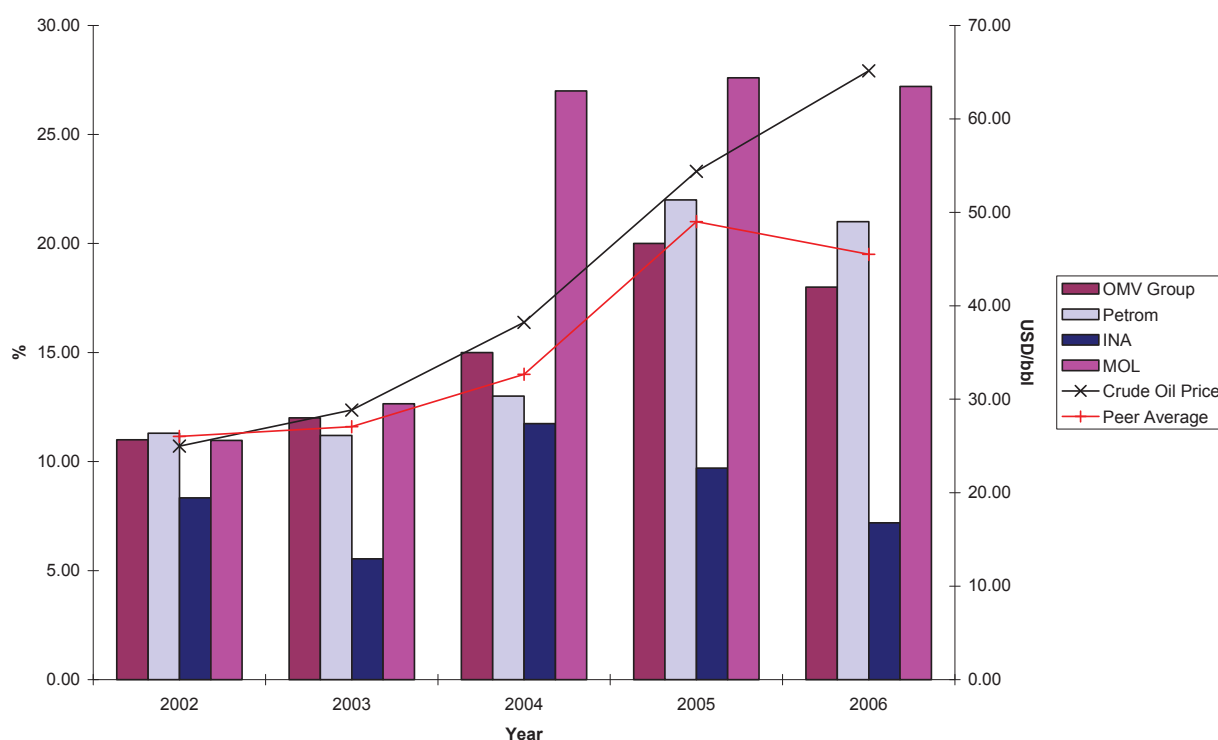


Fig. 18: Return of Average Capital Employed in Percent versus Time

¹⁹¹ see OMV, Annual Report 2006, p. 3

¹⁹² see Petrom Annual Report 2004, p. 37; Annual Report 2006, p. 124

¹⁹³ see INA, Annual Reports 2003, p. 58; Annual Report 2005, p. 58

¹⁹⁴ see MOL, Annual Reports 2002-2006

The Development of the individual Companies

As part of their strategy until 2010, the OMV Group tries to attain a stable profitability target of 13 percent.

In 2002, the OMV Group failed their target of 13 percent because of poor trading conditions and higher investments in growth strategies.¹⁹⁵ Favourable trading environments and an effective execution of OMV's strategy, which led to an increasing ROACE and increasing profitability, characterized the following years.¹⁹⁶ In 2005, a redefinition of the ROACE was necessary because of the change from the Austrian Commercial Code to the International Financial Reporting Standards (IFRS).¹⁹⁷ The year 2006 showed a decrease of profitability that was caused by heavy capital investments, which led to a decrease of the Groups financial performance ratios in spite of the earnings growth.¹⁹⁸

The Romanian Petrom's ROACE remained on high level in the years 2005 and 2006 because of 'an increased NOPAT (+ 55 percent), mainly due to a higher net profit.'¹⁹⁹

MOL's Group target for 2010 is to reach a 15 percent ROACE.²⁰⁰ To achieve this target, the company wants to increase upstream integration by tripling hydrocarbon production and to double refined products sales. However, an already strong operating performance allowed the Hungarian MOL to reach this extraordinary high return on average capital employed (see Fig. 18). As already mentioned the strategy of the Hungarian MOL was very successful and made it to one of the best performing integrated oil companies in the period 2002 until 2005.²⁰¹

General Trends and the Dependence on the Oil Price

A look at Fig. 18 shows that the average ROACE steeply pitched as the crude oil price until 2005. Although the companies make big profits, their high capital expenditures do not allow higher profitability.

3.3.8 Development of the Finding Costs

The definition and explanation of the "finding costs" is found in chapter 3.1. This indicator shows the performance of the efficiency of the exploration and production segment of a company. How the finding costs evolve between 2002 and 2006 shows Tab. 17 below.

¹⁹⁵ see OMV, Annual Report 2002, p. 2, p. 10

¹⁹⁶ see OMV, Annual Reports 2003, 2004

¹⁹⁷ see OMV, Annual Report 2005, p. 23

¹⁹⁸ see OMV, Annual Report 2006, p. 52

¹⁹⁹ see Petrom, 2006 Annual Report prepared in compliance with the requirements of the Regulation no1/2006 of NSC, p. 21

²⁰⁰ see MOL, Annual Report 2006, p. 1

²⁰¹ see MOL, Annual Report 2005, p. 4

Finding Costs, \$/boe	2002	2003	2004	2005	2006
OMV Group ²⁰²	2.26	2.59	1.63	1.80	2.30
Petrom ²⁰³	/	/	/	1.30	2.90
INA ²⁰⁴	2.34	4.85	4.62	2.14	2.68
MOL ²⁰⁵	2.03	3.26	7.30	7.68	5.40
OMV Austria ²⁰⁶	2.22	2.22	1.85	1.86	4.05
Peer Average	2.21	3.23	3.85	2.96	3.47

Tab. 17: Finding Costs in USD per boe

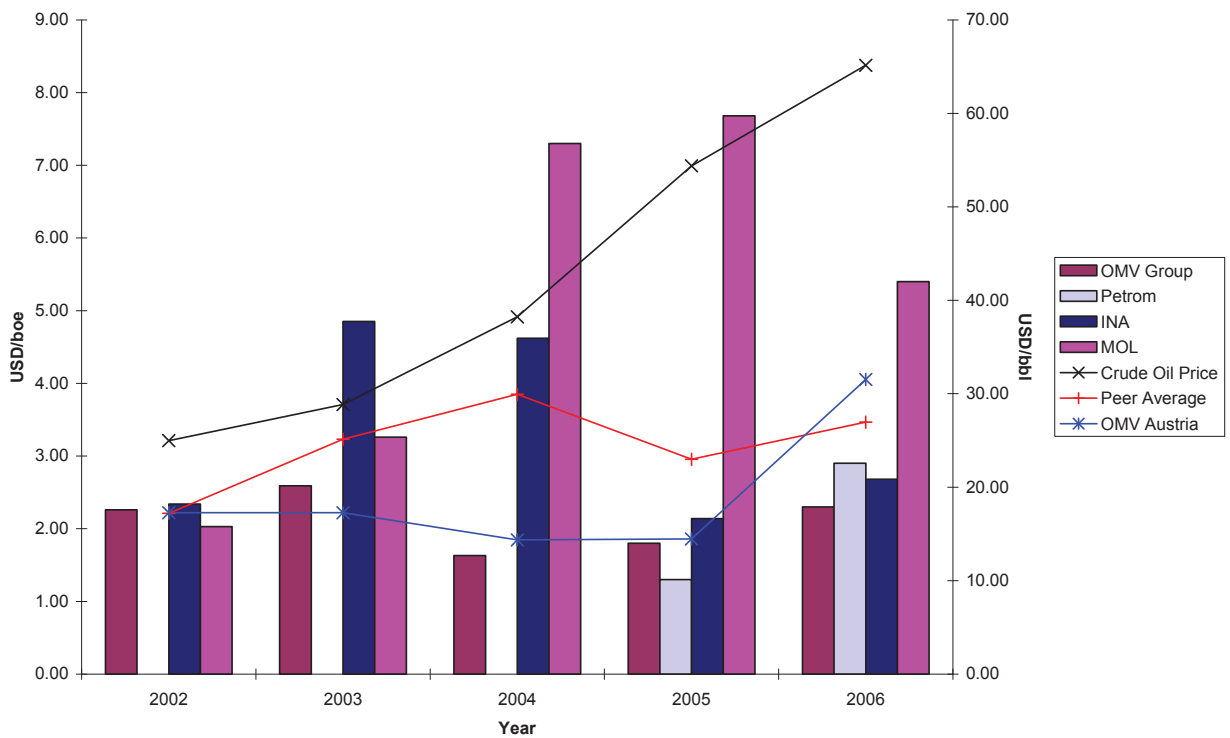


Fig. 19: Finding Costs in USD/boe versus Time

The Development of the individual Companies

The course of the diagram of the Austrian OMV shows very graphic how the costs rise by time and sunk in 2004, after the acquisition of the Romanian Petrom and the rise of the net proved reserves. In the following years the finding costs rise accurately because of high investments to strength their position and to support their growth strategy.

²⁰² see OMV, Annual Reports 2002-2006

²⁰³ source OMV Austria

²⁰⁴ see INA, Annual Reports 2002-2006

²⁰⁵ see MOL, Annual Reports 2003-2006

²⁰⁶ source OMV Austria

No data for the years 2002 until 2004 of Romanians Petrom were available to make an accurate analysis of the behaviour of their finding costs. However, the data of 2005 and 2006 show that the finding costs increases because of higher investments and the decrease of their reserves (see Fig. 19).

The high costs in the years 2004 and 2005 of the Hungarian MOL are explained by significant investments abroad and the decrease of their overall net proved reserves.²⁰⁷

The Croatian INA halved their costs in the year 2005 by the discovery of additional volumes of oil, condensate, and natural gas in deeper reservoir in Syria.

General Trends and the Dependence on the Oil Price

A continuous increase could be identified as general trend for the finding costs (see Fig. 19). This trend result of the high investments of the companies to increase their reserves and their production while their proven reserves continuously decrease (see Fig. 14).

3.3.9 Development of the Production Costs

The definition of “production costs” is given in chapter 3.1. With the help of this indicator, the efficiency how a company produces can be shown. It has also an influence on the EBIT, because if the production costs are high, the profit of the sales will be small. Tab. 18 shows the development for each company during the period 2002 to 2006.

Production Costs, \$/boe	2002	2003	2004	2005	2006
OMV Group ²⁰⁸	6.18	5.77	5.87	9.82	11.10
Petrom ²⁰⁹	/	/	/	13.10	13.87
INA ²¹⁰	1.46	1.45	5.54	6.20	7.13
MOL ²¹¹	4.45	5.25	5.73	6.05	5.87
OMV Austria ²¹²	5.64	5.47	6.54	6.33	6.78
Peer Average	4.43	4.49	5.92	8.30	8.95

Tab. 18: Production Costs in USD per boe

²⁰⁷ see MOL, Annual Reports 2004, 2005

²⁰⁸ see OMV, Annual Reports 2002-2006

²⁰⁹ see OMV, Aktionärsinformation Q4 2005, 2006

²¹⁰ see INA, Annual Reports 2002-2006

²¹¹ see MOL, Annual Report 2006, p. 143

²¹² source OMV Austria

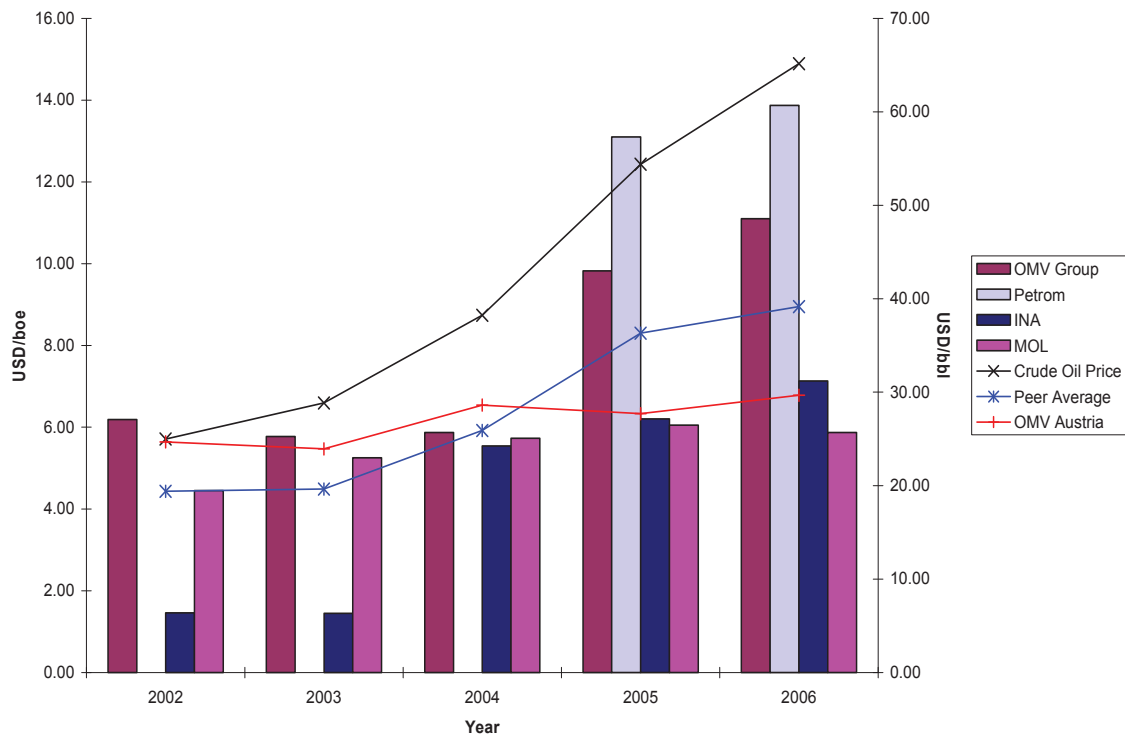


Fig. 20: Production Costs in USD/boe versus Time

The Development of the individual Companies

The increase of the production costs for the OMV Group and OMV Austria was a result of the high cost inflation in the oil industry especially in the oil service sector and the devaluation of the USD versus the Euro.²¹³

Unfortunately, it was not possible to gain any data for the production costs of the Romanian Petrom before the year 2005. In 2005, the production costs of Petrom increased because of higher costs for maintenance and repair and for preparations for the winter 2005.²¹⁴ The increase of production costs in 2006, were caused by higher costs for services and because of a lower production that cannot be compensated by restructuring measures. Another effect that lead to an increase of the production costs were the exchange rates between the Romanian Leu, the US dollar and the Euro.²¹⁵

In 2004, the production costs of the Croatian INA more than triples. This is because of the started production of the offshore fields in the North Adriatic and another reason is the high water production (see Fig. 20).²¹⁶

The main reason of the increasing production costs with the Hungarian MOL was the increase of the level of finished inventory goods. In 2006, this trend changed. Although the personnel expenses increased by two percent and the operating expenses by 28 percent, the production costs could be decreased because of the decrease of finished inventory goods.²¹⁷

²¹³ see OMV, Annual Report 2006

²¹⁴ see OMV, Aktionärsinformation Q4, p. 10

²¹⁵ see MOV, Aktionärsinformation Q4, p. 7

²¹⁶ see INA, Annual Report 2004, p. 38ff

²¹⁷ see MOL, Annual Report 2006, p. 39

General Trends and the Dependence on the Oil Price

The correlation of the production costs to the crude oil price show a continuous increase. (see Fig. 20) The main reason was the cost inflation for services in the oil industry and the average decline of the annual production (see Fig. 13).

3.4 Analysis of the Exploration and Production Peer Group Data

This chapter is dedicated to the descriptive analysis of OMV Austria in comparison with its E&P Peer group. The structure of this chapter is like that of chapter 3.3. For each performance indicator a detailed analysis is done. If the description of a company is not as explicit as that of others, it shows the problem to get enough reliable information.

3.4.1 Overview over the E&P Peer Group Members

The OMV defined an E&P Peer Group, with whom they compare themselves. These companies do have approximately the same size and the same business fields of interests. The members of the E&P Peer Group are listed below:

Anadarko Petroleum Corporation	(USA)
Apache Corporation	(USA)
BG Group	(United Kingdom)
Burlington Resources Incorporation	(USA)
Hess Corporation	(USA)
Marathon Oil	(USA)
Occidental Petroleum Corporation	(USA)
Petro-Canada	(Canada)

The Anadarko Petroleum Corporation is an American E&P company and one of the largest independent oil and gas companies worldwide. The main operational areas include the deepwater Gulf of Mexico, Texas, Louisiana, and the mid-continent basins, the Canadian Rockies, Alaska, China, Algeria, Venezuela, and Qatar. The company actively markets natural gas, oil, and natural gas liquids, owns, and operates gas gathering and processing systems.²¹⁸

The American Apache Corporation is an independent energy company with its upstream core regions in the United States, Canada, Egypt, Australia, the United Kingdom, and Argentina. The regions outside the United States represent 63 percent of their production and 60 percent of the company's reserves.²¹⁹

The BG Group is an integrated energy company with its headquarter in the United Kingdom. The company's business operations take place in 25 countries on five continents. The areas of interest include the LNG transport from Trinidad and Tobago, E&P businesses in the United States, Canada, Kazakhstan, Egypt, Tunisia, power businesses in Malaysia, Philippines, Thailand, and gas distribution businesses in Brazil and Bolivia. The core business sectors are - E&P, liquefied natural gas, transmission and distribution, power. The company's core strength is "the gas chain from reservoir to burner tip".²²⁰

Burlington Resources Inc. was one of North America's largest producers of natural gas with its headquarter in Houston, Texas and one of the world's largest independent oil and

²¹⁸ see Anadarko Petroleum Corporation, Annual Report 2006, p. 1

²¹⁹ see Apache, 2007

²²⁰ see BG Group, 2007; BG Group, Annual Report 2004

gas companies. It was formed 1988 as a holding company for Burlington Northern Railroad Company. Their core area was North America but it owned also assets in Canada, Northwest Europe, Algeria, Angola, Gabon, China, Colombia, Ecuador, and Peru. In 2005, the company was taken over by ConocoPhillips for 35.6 billion USD and disappeared as independent brand and public company.²²¹

The American Amerada-Hess Corporation is an independent and integrated energy company that operates all over the world. Its core businesses are the exploration and production of crude oil and natural gas as well as the refining and the marketing of the refined products. The areas of operation are the United States, the United Kingdom, Norway, Denmark, Equatorial Guinea, Gabon, Azerbaijan, Thailand, and Indonesia. In 2006, the company changed their name into Hess Corporation. This change in their name should strengthen the recognition of their brand across all of their operations.²²²

Marathon Oil Corporation is an integrated international energy company engaged in E&P, integrated gas and refining, marketing and transportation and is the fifth-largest refiner with seven refineries in the United States and the fourth-largest U.S. based fully integrated energy company. In 2001, Marathon Oil Corporation became a standalone energy company by separating of from United States Steel Corporation. The company's headquarter is in Houston, Texas. The areas of operation include the United States, Angola, Equatorial Guinea, Gabon, Indonesia, Ireland, Indonesia, Libya, Norway, the Ukraine, and the United Kingdom. Marathon is also an expert in liquefied natural gas (LNG) technology for more than 35 years and found with Equatorial Guinea a partner to build up a LNG plant until 2007.²²³

Occidental Petroleum Corporation is the fourth largest U.S. oil and gas company exploration and production company with operations in the United States, Libya, Oman, Qatar, Yemen, Colombia, and Argentina. Occidental is the largest oil producer in Texas and the largest natural gas producer in California. Another core business of Occidental is the chemical manufacturing.²²⁴

Petro-Canada is one of the largest Canadian oil and gas companies and the second- largest downstream company with its headquarter in Calgary, Alberta. The company's five core businesses are the offshore Canadian East Coast oil, the Alberta oil sands, North American natural gas, refining & marketing, and international E&P. The international areas of interest are the United Kingdom, the Netherlands, Norway, Denmark, Trinidad & Tobago, Venezuela, Syria, Libya, Algeria, Morocco, and Tunisia. The refining capacity of Petro-Canada represents 17 percent of Canada's total capacity.²²⁵

The following chapters are dedicated to the analyses of the former defined key performance indicators (see chapter 3 and 3.1), before finally in chapter 4 the benchmarking with the OMV Austria will be done.

²²¹ see Burlington Resource Inc, Annual Report 2002; ConocoPhillips, 2007

²²² see Hess Corporation, 2007; Hess Corporation, Annual Report 2006, p. 3

²²³ see Marathon Oil Corporation, 2007

²²⁴ see Occidental Petroleum Corporation, 2007

²²⁵ see Petro-Canada, 2007

3.4.2 Development of the Earnings before Interest Taxes

This chapter is dedicated to the analysis of the development of the earnings before interest and taxes (EBIT) of the E&P peer members. The definition and description of the EBIT is shown in chapter 3.1.

The development of the EBIT of the E&P peer group members is shown in Tab. 19 below.

EBIT, \$MM	2002	2003	2004	2005	2006
OMV Group ²²⁶	470,25	727,72	1150,09	2435,75	2588,62
Anadarko ²²⁷	1410,00	2227,00	2829,00	4096,00	4893,00
Apache ²²⁸	1013,95	2047,12	2780,43	4324,69	4165,75
BG Group ²²⁹	1356,05	2217,73	2911,26	4661,96	6182,23
Burlington ²³⁰	843,00	1830,00	2586,00	4329,00	/
Hess Corporation ²³¹	218,00	1074,00	1799,00	2450,00	4241,00
Marathon Oil ²³²	1197,00	1837,00	2198,00	4955,00	9088,00
Occidental Oil ²³³	1880,00	3154,00	4574,00	7585,00	8192,00
Petro Canada ²³⁴	1283,44	2255,05	2604,26	2944,09	3647,59
OMV Austria ²³⁵	182,68	184,63	151,45	270,38	329,50
Peer Average	985.44	1755.43	2358.35	3805.19	4814.19

Tab. 19: Earnings before Interests and Taxes in USD Million

²²⁶ see OMV, Annual Reports 2002-2006

²²⁷ see Herold Database, 2007

²²⁸ see Herold Database, 2007

²²⁹ see Herold Database, 2007

²³⁰ see Herold Database, 2007

²³¹ see Herold Database, 2007

²³² see Herold Database, 2007

²³³ see Herold Database, 2007

²³⁴ see Herold Database, 2007

²³⁵ source OMV Austria

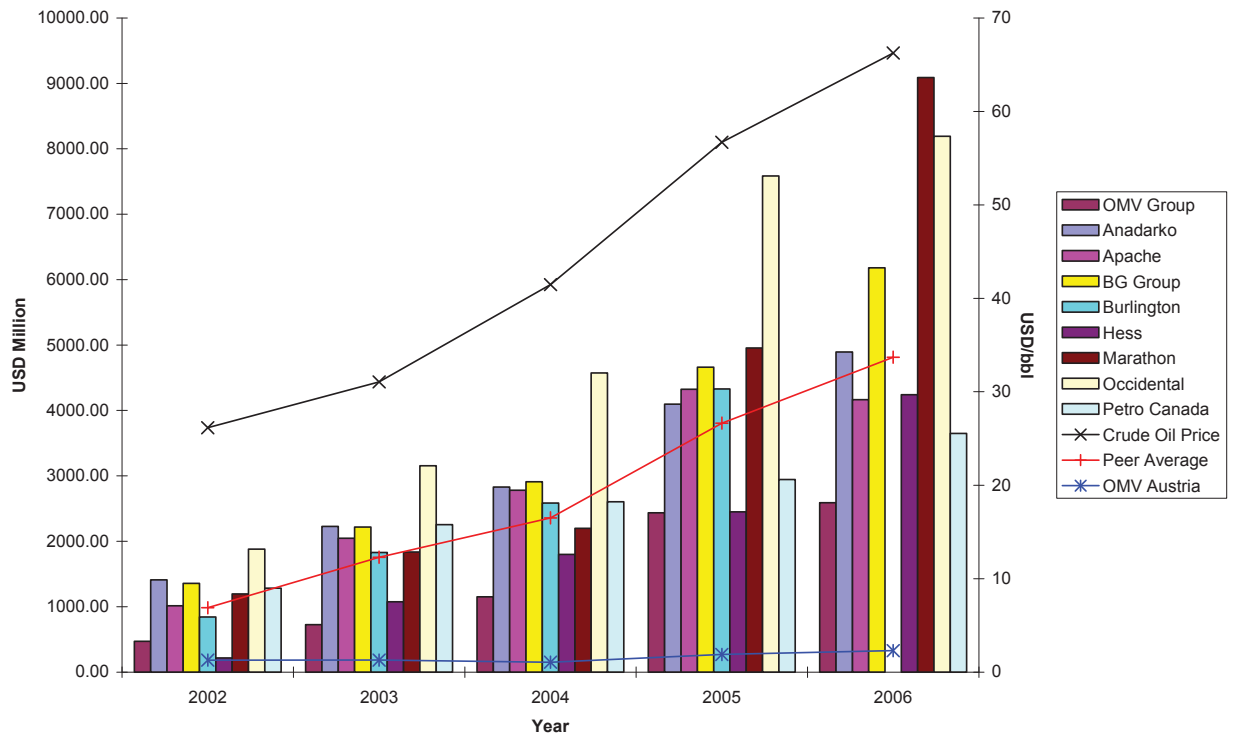


Fig. 21: EBIT in USD Million versus Time

Fig. 21 displays graphically the development of the EBIT with time. The absent of the 2006 EBIT of the Burlington Resources Incorporation is explainable because of their acquisition through ConocoPhillips in 2006. It is significant to see the impact of the increasing crude oil price on the EBIT of each of the companies.

EBIT/boe	2002	2003	2004	2005	2006
OMV Group	15.47	16.69	25.06	19.75	21.86
Anadarko	7.21	11.59	14.80	25.92	25.31
Apache	8.14	13.44	16.95	26.63	22.92
BG Group	8.09	11.07	16.27	22.00	27.91
Burlington	5.39	12.11	15.57	25.17	/
Hess Corporation	7.88	7.89	14.05	19.64	31.65
Marathon Oil	8.84	15.20	22.70	42.21	67.75
Occidental Oil	9.99	15.78	22.11	36.59	37.41
Petro Canada	11.77	17.14	21.09	24.53	27.71
OMV Austria	12.30	14.48	13.13	24.63	29.53
Peer Average	8.95	13.57	17.71	26.65	33.05

Tab. 20: EBIT divided by the annual Production Rate

Fig. 22 shows the relationship between the EBIT and the annual production rate. It shows how many earnings before interest and taxes were done per boe of produced oil respectively.

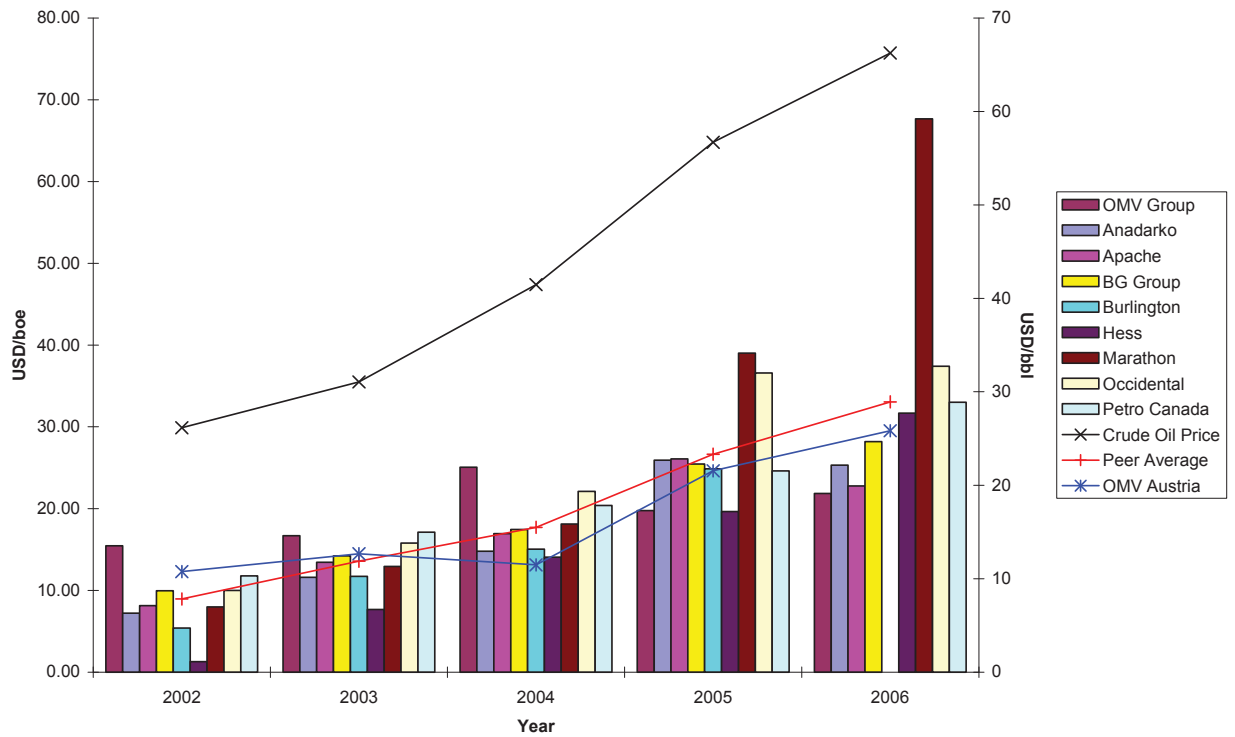


Fig. 22: EBIT/boe in USD/boe Production versus Time

As shown in Fig. 22 increased the EBIT of each of the companies of the E&P Peer group. Main reasons for this development were the continuously increased international oil and gas prices (see chapter 3.2), successful international acquisitions led to positive affects in the creation of value and the concentration on new core areas especially in Europe, Africa/Middle East, and South America.

Unfortunately, no detailed analysis for the EBIT is possible, because the companies' reports are done in the US Standard USGAAP that do not calculate the EBIT. All information about the EBIT were taken from the database www.herold.com.

3.4.3 Development of the total annual Oil and Gas Production

A description of the annual oil and gas production see in chapter 3.1. How the position of a company changed within the years and how the company developed is shown in Tab. 21.

Total Oil & Gas Production, Mmboe/yr	2002	2003	2004	2005	2006
OMV Group ²³⁶	30.40	43.60	45.90	123.30	118.40
Anadarko ²³⁷	195.67	192.17	191.17	158.05	193.33
Apache ²³⁸	124.64	152.35	164.05	165.89	182.91
BG Group ²³⁹	136.07	156.00	166.83	183.17	219.37
Burlington ²⁴⁰	156.30	156.10	171.93	174.13	/
Hess Corporation ²⁴¹	169.00	140.00	127.83	124.67	133.83
Marathon Oil	148.50	140.67	121.33	124.00	134.33
Occidental Oil ²⁴²	188.17	199.83	206.83	207.32	219.00
Petro Canada ²⁴³	109.00	131.67	127.67	119.60	110.50
OMV Austria ²⁴⁴	14.11	14.42	14.33	13.66	14.01
Peer Average	127.34	132.81	133.79	139.68	147.30

Tab. 21: Total annual Production in Million boe per Year

The Development of the individual Companies

Anadarko's annual production of 2002 decreased in relation to 2001. Factors that led to this development were property sales, strikes in Venezuela, and two hurricanes at the Gulf of Mexico. The natural production declines in the United States and a decrease in development drilling were also drivers of the decreased annual production.²⁴⁵ In 2003, the annual production sunk for three percent compared to 2002. Responsible were lower output volumes in Canada resulting from divestiture of heavy oil properties, and lower output volumes in Algeria because of cost recovery.²⁴⁶ The repeated decline in 2004's production was given by divestitures in the United States and in Canada and natural production, declines in areas that were targeted for these divestitures programs.²⁴⁷ The low volume of the annual production in 2005 resulted from the previous year's divestitures. This led to a decrease in production of nearly 20 percent. Still 80 percent of Anadarko's annual production came from its North American assets.²⁴⁸ The increase of production in 2006 was given by strong output volumes of the new acquisitions Kerr-McGee Corporation and the Western Gas Resources, Inc.²⁴⁹

²³⁶ see OMV, Annual Report 2006, p. 4

²³⁷ see Herold Database, 2007

²³⁸ see Apache Corporation, Annual Reports 2002-2006

²³⁹ see Herold Database, 2007

²⁴⁰ see Herold Database, 2007

²⁴¹ see Herold Database, 2007

²⁴² see Herold Database, 2007

²⁴³ see Herold Database, 2007

²⁴⁴ source OMV Austria

²⁴⁵ see Anadarko Petroleum Corporation, Annual Report 2002

²⁴⁶ see Anadarko Petroleum Corporation, Annual Report Form 10-K 2003

²⁴⁷ see Anadarko Petroleum Corporation, Annual Report Form 10-K 2004

²⁴⁸ see Anadarko Petroleum Corporation, Annual Report Form 10-K 2005

²⁴⁹ see Anadarko Petroleum Corporation, Annual Report 2006

The year 2003 was a very successful year for the Apache Corporation. The average annual production rose up by 22 percent.²⁵⁰ In 2004, the daily production grew for 7.4 percent. This increase was possible because of acquisitions in the Permian Basin of West Texas and New Mexico and higher production rates in all core regions. The production increased for the 25th-time in the last 26 years.²⁵¹ Hurricane damage to the production facilities in the Gulf of Mexico decreased production in 2004 significantly. However, an active worldwide drilling program enabled a year-end increase of the annual production.²⁵² The hurricane season interrupted production in the Gulf of Mexico also in 2005. Nevertheless, Apache still was able to increase production for 1.4 percent. In a five-year average, the company was able to increase its production for more than 75 percent. Apache's four regions outside the United States represented 62 percent of the company's annual production.²⁵³ In 2006, the assets in the United States delivered 37.1 percent of the total annual production, 44.9 percent came from the international assets in Egypt, Australia, the United Kingdom, Argentina, and China.²⁵⁴

During 2002, the BG Group increased their production by 25 percent.²⁵⁵ In 2003, the annual oil and gas production rate rose for 15 percent. The strong performance in the United Kingdom was complemented by existing and new fields in Egypt or the UK North Sea.²⁵⁶ The annual production rose again for seven percent in 2004. 72 percent of BG Group's production was made up of gas. Drivers for the increased production were Kazakhstan, production from fields in Egypt and newly acquired assets in Canada and Trinidad. Nearly 40 percent of 2004's production came from the assets in the United Kingdom.²⁵⁷ In 2005, the annual production rose by ten percent compared to 2004. The main contributors to this increase were Kazakhstan (4.4 Mmboe) and Egypt (21.1 Mmboe). Nearly 30 percent of the Annual production came from the United Kingdom and 19 percent from Kazakhstan, from the Karachaganak field.²⁵⁸ The BG Group recorded an increase of production by 19 percent in 2006. The main drivers were the assets in Egypt and Trinidad & Tobago.²⁵⁹

In 2002, Burlington had an annual oil and gas production of 156.30 Mmboe per year (see Tab. 21). The compound of the production was 53 percent came from the United States, 39 percent from Canada and the rest of eight percent of international assets. While the production in the United States continuously declined, the production of oil and gas in Canada nearly doubled to 2001.²⁶⁰ In 2003, the United States delivered 50 percent, Canada 41 percent, and international assets nine percent of the annual production. At the end of the year production started in Algeria, China Ecuador, and the East Irish Sea, but these rates were not included before 2004.²⁶¹ Production increased in relation to 2003 for ten percent in 2004. The reasons were mentioned before. The output of oil and gas was composed by 53 percent respectively 47 percent from the United States, 19 percent respectively 43 percent from Canada and 28 percent respectively ten percent from the

²⁵⁰ see Apache Corporation, Annual Report 2003

²⁵¹ see Apache Corporation, Annual Report 2004

²⁵² see Apache Corporation, Annual Report 2004

²⁵³ see Apache Corporation, Annual Report 2005

²⁵⁴ see Apache Corporation, Annual Report 2006

²⁵⁵ see BG Group, Annual Report 2002

²⁵⁶ see BG Group, Annual Report 2003

²⁵⁷ see BG Group, Annual Report 2004

²⁵⁸ see BG Group, Annual Report 2005

²⁵⁹ see BG Group, 2007

²⁶⁰ see Burlington Resources Incorporation, Annual Report 2002

²⁶¹ see Burlington Annual Report Consistent Reasons 2003

international assets in overseas.²⁶² During year 2005, the production rate increased for the second year in a row. The United States delivered 52 percent, Canada 34 percent and the international assets 13 percent for the total annual oil and gas production.²⁶³ For 2006, no further data was available, because of the take-over by ConocoPhillips.

In 2002, Hess reached the highest annual production in their company's history, but Hess failed its target of 470,000 barrel per day.²⁶⁴ The production increased for four percent due to 2001. The decrease of the annual production in 2003 was also driven by natural declines and the reduced production of the Ceiba Field in Equatorial Guinea but nearly 60 percent of the decline was due to asset sales and exchanges.²⁶⁵ Like in 2003, the annual production declined in 2004 for nearly ten percent. The main reason is the maturity of fields in the core areas. A change in this trend was expected for 2006.²⁶⁶ The year 2005, was similar to other companies, which were operating in the Gulf of Mexico. The hurricanes Rita and Katrina had a negative impact on the annual production. Another reason for the low production output was that in the United Kingdom some fields were temporary downtime.²⁶⁷ In 2006, Hess changed its trend of decreasing production. The first time for nearly five years the output of production increased for seven percent. This was possible by bringing four new fields in Thailand, Equatorial Guinea, the United Kingdom North Sea, and Azerbaijan into production.²⁶⁸

In 2002, the annual production of Marathon Oil Corporation increased by one percent in relation to 2001 production. Nearly 80 percent of Marathons annual production came from the United States and the United Kingdom, were 60 percent of the liquid and 61 percent of the natural gas production came from United States operations.²⁶⁹ Reasons for the 2003 decline of the annual production were natural field decline, longer well dewatering programs, and the delay in project commissioning in Norway. The core region of Marathon still was the United States were 57 percent of the liquid production and 63 percent of the natural gas were produced. Nevertheless, production decreased in 2003 for nearly five percent in relation to 2002. In 2002, 43 percent of the production of liquid hydrocarbons and 37 percent of the natural gas production came from international operations.²⁷⁰ In 2004, the annual production sunk to 121.55 million boe per year, which marked the lowest period of production since 1993.²⁷¹ After this year of low production, the annual oil and gas production increased again in 2005 for nearly three percent. The main reason for this increase was the return to Libya. The production in the United States was influenced by five storms and hurricanes during the years and the still existing natural field decline.²⁷² The decrease of nine percent in the annual production of natural gas in 2006 was cushioned by the increase of the crude oil production of 36 percent during the year.²⁷³

The increase of Occidental Petroleum Corporations annual production in 2002 was the result of enhanced recovery using infill drilling and CO₂ injections and a successful drilling

²⁶² see Herold, John S., Burlington Resources, Upstream Profile, April 2005

²⁶³ see Herold Database, 2007

²⁶⁴ see Hess Corporation, Annual Report 2002

²⁶⁵ see Hess Corporation, Annual Report 2003, page 17

²⁶⁶ see Hess Corporation, Annual Report 2004

²⁶⁷ see Hess Corporation, Annual Report 2005

²⁶⁸ see Hess Corporation, Annual Report 2006

²⁶⁹ see Herold, S. John, Marathon Oil, Strategic Evaluation, October 2003

²⁷⁰ see Herold, S. John, Marathon Oil, Strategic Evaluation, July 2004; Marathon Oil Corporation, Annual Report 2003

²⁷¹ see PFC Energy, November 2006

²⁷² see Marathon Oil Corporation, Annual Report 2005

²⁷³ see Marathon Oil Corporation, Annual Report 2006

program.²⁷⁴ The successful development program in 2002 led to an increase of production by six percent in 2003. The highest increase of production was in the United States, which produced 63 percent of the annual production volume. In Latin America the output volume increased by 19 percent in relation to 2002.²⁷⁵ In 2004, the increase of production was by 3.5 percent from 547,000 boe per day to 566,000 boe per day, where the United States delivered 60 percent. Again, the annual production rose in Latin America for 39 percent compared to 2003. In the Middle East, a new gas project in Oman went into production and increased the local production by seven percent.²⁷⁶ Like the years before the production increased in 2005. The main reasons were the beginning production in Libya, the start up of the Mukhaizna project and the resumption of full production in the Gulf of Mexico in the wake of the hurricanes.²⁷⁷ In 2006, the annual production rose by 14 percent to 219 Mmboe per year. The main reason for this increase was the acquisition of Vintage Petroleum's operations in Argentina.²⁷⁸

In 2002, the Canadian Petro-Canada produced 109 Mmboe, which was an increase of nearly 75 percent in relation to 2001.²⁷⁹ Between 2001 and 2003, the annual production increased for 125 percent and the Canadian/International production mix changed from 98% / 2% in 2001 to 61% / 39% in 2003. This radical change was possible through the acquisition of the European oil and gas company Veba Oil & Gas. The annual production included 54 percent conventional oil and gas from Canada, seven percent from Syncrude (oil sands) and 39 percent from the international assets in Northwest Europe, North Africa/Near East, and Northern Latin America.²⁸⁰ In 2004, the annual production decreased (see Tab. 21). One cause was that the Terra Nova field (East Coast Oil) underwent significant maintenance work, which limited production. The disposition of properties in Western Canada caused the decrease in conventional crude oil and natural gas production. International production sunk from 210,000 boe per day to 196,700 boe per day. Higher production in Trinidad and Northwest Europe was offset by lower production in Syria due to natural declines in the existing mature fields.²⁸¹ The decline of production of the Western Canada fields continued in 2005 although the company pursued an intensive and successful exploration and development drilling activities project. Again, work to improve Terra Nova's reliability decreased production of East Coast Oil. Internationally the production sunk because of lower production in Northwest Europe.²⁸² In 2006, the natural declines in Western Canada of eight percent were partially offset by U.S. Rockies production growth of six percent. Because of the shut down of the Terra Nova FPSO for a planned dry dock turnaround, the production volume of East Coast Oil decreased once again. Northern Latin America and Northwest Europe were the main cause for the decline of production in the international assets of Petro-Canada.²⁸³

²⁷⁴ see Occidental Petroleum Corporation, Annual Report 2002

²⁷⁵ see Occidental Petroleum Corporation, Annual Report 2003

²⁷⁶ see Occidental Petroleum Corporation, Annual Report 2004

²⁷⁷ see Occidental Petroleum Corporation, Annual Report 2005

²⁷⁸ see Occidental Petroleum Corporation, Annual Report 2006

²⁷⁹ see Petro-Canada, Annual Report 2002

²⁸⁰ see PFC Energy, Marathon Strategy & Performance Profile 2003

²⁸¹ see Petro-Canada, Annual Report 2004

²⁸² see Petro-Canada, Annual Report 2005

²⁸³ see Petro-Canada, Annual Report 2006

General Trends and the Dependence on the Oil Price

Related to the CEE peer group, the annual oil and gas production increased continuously between 2002 and 2006. Except of the OMV and the BG Group, every member of the E&P peer group was confronted with the hurricane seasons and the resulting production downtime in the Gulf of Mexico. On the other hand, every company took high investments to countermeasure the domestic natural decline of their fields. In the case of the E&P peer group the premise of an increasing production if the crude oil price increased showed its truth, even only the average peer production shows this continuous increase.

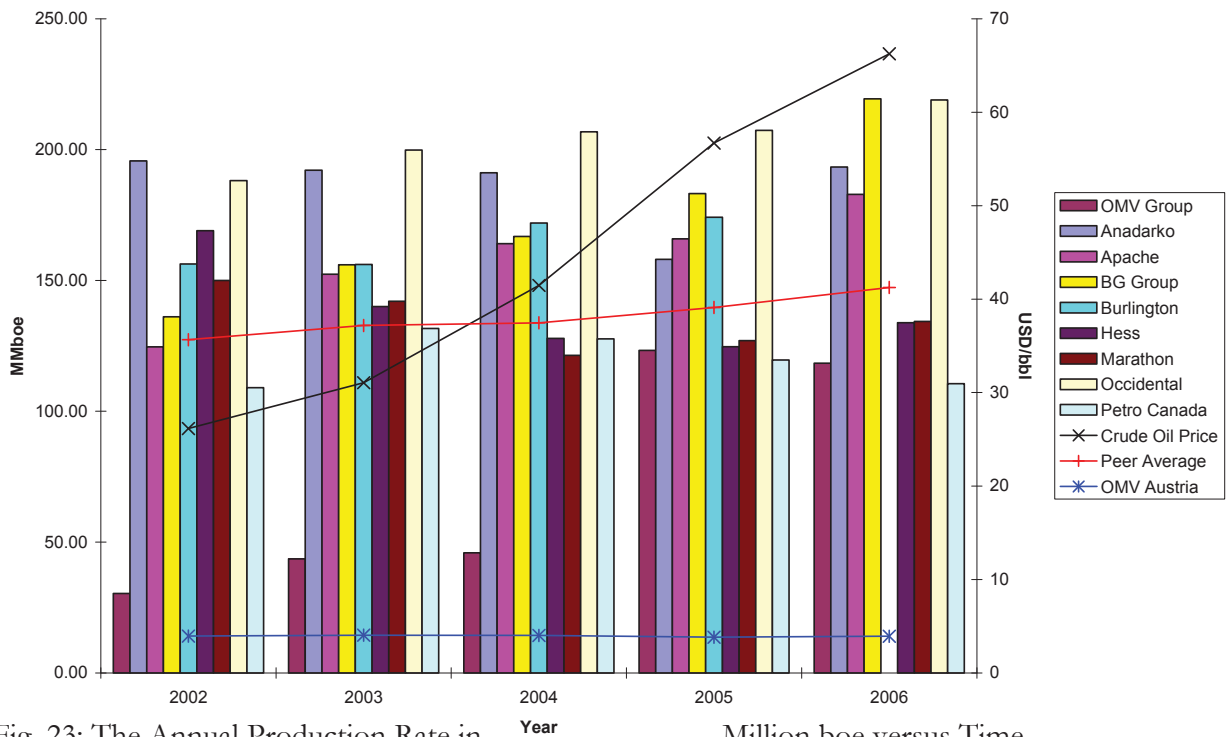


Fig. 23: The Annual Production Rate in Million boe versus Time

3.4.4 Development of the total proven Oil and Gas Reserves

The definition and description of the total proven oil and gas reserves see chapter 3.1. The increase in reserves is a sign, that the company follows a successful strategy to consolidate its position in the market.

Total Proved Oil & Gas Reserves, Mmboe	2002	2003	2004	2005	2006
OMV Group ²⁸⁴	343.10	410.10	384.40	1364.60	1289.30
Anadarko ²⁸⁵	2327.67	2513.33	2367.67	2448.33	3011.67
Apache ²⁸⁶	1312.54	1656.55	1936.69	2117.25	2313.19
BG Group ²⁸⁷	1919.40	2104.27	2147.47	2183.47	2149.30
Burlington ²⁸⁸	1903.10	1958.67	2001.20	2080.70	/
Hess Corporation ²⁸⁹	1194.83	1034.67	1046.00	1093.00	1243.00
Marathon Oil ²⁹⁰	1282.83	1042.00	1138.67	1295.17	1262.00
Occidental Oil ²⁹¹	2311.50	2470.33	2531.83	2706.67	2899.00
Petro Canada ²⁹²	1290.00	1220.00	1213.00	1232.00	1274.00
OMV Austria ²⁹³	155.90	152.30	148.65	150.50	146.80
Peer Average	1404.09	1456.22	1491.56	1667.17	1732.03

Tab. 22: Total proven Oil and Gas Reserves in Million boe

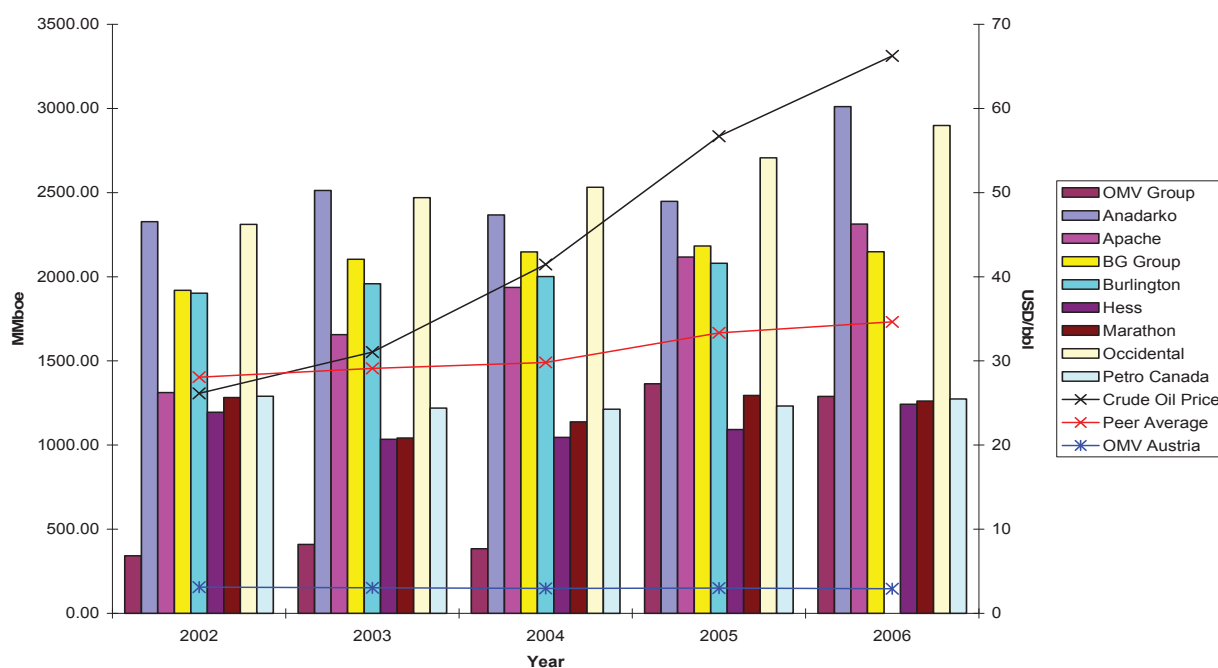


Fig. 24: Total proven Oil and Gas Reserves in Million boe

²⁸⁴ see OMV, Annual Report 2006

²⁸⁵ see Herold Database, 2007

²⁸⁶ see Apache Corporation, Annual Reports 2002-2006

²⁸⁷ see Herold Database, 2007

²⁸⁸ see Herold Database, 2007

²⁸⁹ see Herold Database, 2007

²⁹⁰ see Marathon Oil Corporation, Annual Reports 2002-2006

²⁹¹ see Herold Database, 2007

²⁹² see Petro-Canada, Annual Reports 2006, p. 3

²⁹³ source OMV Austria

The Development of the individual Companies

The Anadarko Petroleum Corporation reached in 2002 a one-year reserve-replacement rate of 112 percent of production, which meant an increase of proven reserves of one percent. High drilling activities made this possible. Above all the proven reserves in the United States increased for 111 million boe.²⁹⁴ Also 2003 was a very successful year for Anadarko in regarding the reserve replacement. The reserve-replacement rate in percent of production rose up to 196 percent. Still 69 percent of the company's reserves were located in the United States, 12 percent came from Canada, 14 percent from Algeria, and the rest of 5 percent came from international operational areas.²⁹⁵ Because of restructuring actions in 2004, Anadarko sold nearly eleven percent of their proven reserves.²⁹⁶ The increase of three percent of the proven reserves in 2005 was mainly driven by successful exploration and development drilling onshore North America and in the deepwater of the Gulf of Mexico.²⁹⁷ Because of the acquisitions of Kerr-McGee Corporation and Western Gas Resources, Inc and successful exploration and development, drilling in the United States the proved reserves increased during 2006 by 23 percent.²⁹⁸

In 2002, Apache was able to increase its reserves by four percent compared to 2001, of which 51 percent were natural gas. This increase was mainly influenced by natural gas acquisitions in the United States. Apache had proven reserves in 2002 of 49 percent in the United States, 29 percent in Canada, ten percent in Egypt, eleven percent in Australia, one percent in other international operational areas.²⁹⁹ In 2003, Apache acquired the Forties Field, the largest field in the United Kingdom North Sea. This added 148 million barrels to the companies proved reserves.³⁰⁰ In total, the company was able to add 154 percent of 2003 production.³⁰¹ For the 19th year in a row, Apache increased its proved reserves in 2004. This time the reserves grew by 17 percent.³⁰² A worldwide successful drilling program (91 percent success rate) enabled Apache to increase their proved reserves by 9.3 percent in 2005. This means a 216 percent replacement of production.³⁰³ In 2006, the volume of proven reserves increased again by nine percent. Like the year before the replacement of production reached a high number of 213 percent mainly driven by acquisitions of fields in the United States.³⁰⁴

In 2002, the BG Group increased their proved reserves through acquisitions, new discoveries, and projects by 31 percent.³⁰⁵ In the year 2003 the proved reserves increased by 10 percent which meant a reserve replacement rate of 219 percent.³⁰⁶ The proven reserves increased by two percent in 2004. The BG Group nearly doubled their proven reserves since the end of 1999. The locations of the proven reserves laid by 16 percent in the United Kingdom, 36 percent in Asia and the Middle East and 46 percent in other international areas of interest.³⁰⁷ In 2005, the proven reserves increased from 2147.47 Mmboe to 2183.47

²⁹⁴ see Anadarko Petroleum Corporation, Annual Report 2002

²⁹⁵ see Anadarko Petroleum Corporation, Annual Report 2003, p. I; John S. Herold, Upstream Snapshot, April 2004

²⁹⁶ see Anadarko Petroleum Corporation, Annual Report 2004;

²⁹⁷ see Anadarko Petroleum Corporation, Annual Report 2006, p. 116

²⁹⁸ see Anadarko Petroleum Corporation, Annual Report 2006, p. 3, 116

²⁹⁹ see John S. Herold, Upstream Snapshot, April 2003; Apache Corporation, Annual Report 2002 Form 10-K

³⁰⁰ see Apache Corporation, 2007

³⁰¹ see Apache Corporation, Annual Report 2003

³⁰² see Apache Corporation, Annual Report 2004

³⁰³ see Apache Corporation, Annual Report 2005, p. 2

³⁰⁴ see Apache Corporation, Annual Report 2006

³⁰⁵ see BG Group, Annual Report 2002

³⁰⁶ see BG Group, Annual Report 2003

³⁰⁷ see BG Group, Annual Report 2004; John S. Herold, Upstream Profile, May 2005

Mmboe (see Tab. 22). The main drivers were revisions of previous estimates. Gas was the majority share of the hydrocarbon reserves of the BG Group with nearly 74 percent.³⁰⁸ The volume of reserves declined in 2006 compared to 2005. The main reason was the higher annual production.³⁰⁹

The volume of reserves of Burlington decreased 2002 compared to 2001 because of property sales during the year. However, 64 percent of the total proved reserves of 2002 of Burlington were located within the United States. The replaced reserves reached a percentage of 161 percent.³¹⁰ In 2003, the total proven reserves increased by 3 percent and the reserve replacement rate reached 142 percent. Nearly 85 percent of the company's reserves were located in North America.³¹¹ Burlington reached a 125 percent production replacement rate in 2004. Almost 90 percent of their reserves were located in North America.³¹²

Compared to 2001, the volume of proved reserves of Hess declined in 2002. This decline was caused by negative revisions, reductions in entitlement reserves covered by production sharing due to high year-end commodity prices and asset sales.³¹³ The significant decrease of reserves (see Tab. 22) in 2003 resulted of a swapping of mature, high cost assets in Colombia for long-lived natural gas reserves in the Malaysia-Thailand Joint Development Area. Another reason was the reclassification of reserves of international assets, especially in Africa and Asia, and reductions of reserves from asset exchanges.³¹⁴ In 2004, the production replacement grew to 110 percent, which meant an increase of proven reserves.³¹⁵ The year 2005 was again a strong year for Hess. The proven reserves grew nearly to 1.1 billion barrels of oil equivalent (see Tab. 22). This was possible through a production replacement of 140 percent and the re-entry to Libya and operations in two new countries, Russia and Egypt.³¹⁶ Hess proven reserves increased by 14 percent in 2006. The new assets, which were acquired in the year before made this repeated increase possible.³¹⁷

In 2002, the Marathon Oil Corporation reached a reserve replacement rate of 123 percent from internal additions.³¹⁸ In relation to 2001, the proven oil, and gas reserves increased by 23 percent. Almost 56 percent of Marathons reserves were located in the United States.³¹⁹ The reserve replacement of 124 percent in 2003 led the company to year-end reserves of 1042 Mmboe (see Tab. 22). Marathon had still the problem that their assets were many mature fields. This means that they had a high percentage of developed reserves that led to problems with future planning. In 2003, the proved developed reserves represented 70 percent of Marathon's total reserves compared to 78 percent in 2002. The percentage of domestic reserves declined from 56 percent in 2002 to 46 percent in 2003.³²⁰ Since the acquisition of the new core areas in Russia, the production there increased by 60 percent. The proven reserves of Marathon increased from 1.042 billion barrels of oil equivalent in

³⁰⁸ see BG Group, Annual Report 2005

³⁰⁹ see BG Group, Annual Report 2006

³¹⁰ see Burlington Resources, Annual Report 2002

³¹¹ see Burlington Resources, Annual Report 2003

³¹² see Burlington Resources, Annual Report 2004

³¹³ see Amerada Hess, Annual Report 2002

³¹⁴ see Amerada Hess, Annual Report 2003

³¹⁵ see Amerada Hess, Annual Report 2004

³¹⁶ see Amerada Hess, Annual Report 2005

³¹⁷ see Amerada Hess, Annual Report 2006

³¹⁸ see Herold, S. John, Marathon Oil, Strategic Evaluation, October 2003

³¹⁹ see Marathon Oil Corporation, Annual Report 2002

³²⁰ see Herold, S. John, Marathon Oil, Strategic Evaluation, July 2004; Marathon Oil Corporation, Annual Report 2003

2003 to 1.138 billion barrels of oil equivalent in 2004. Reserve additions in Equatorial Guinea, Norway (Alvheim/Vilje), and Ireland (Corrib) drove the reserve replacement of 2004. The developed reserves in percent in relation of the total net proven reserves declined from 70 percent in 2003 to 62 percent.³²¹ In 2005, the proven reserves increased again. A strong reserve replacement ratio of 175 percent and the return to Libya supported this development. The re-entry to Libya added 165 Mmboe to the Company's proven reserves.³²² Although Libya added significant reserves, the volume of proved reserves declined in 2006 because of the sale of Marathon's Russian upstream business.³²³

With the help of a high oil and gas production replacement ratio of 140 percent, Occidental reached in 2002 an all-time high of reserves of 2.311 billion barrels of oil equivalent (see Tab. 22). In the United States, the company continued to find new oil and gas reserves in the Permian Basin and in California with the help of an intensive development-drilling program.³²⁴ In 2003, the reserve replacement ratio laid by 184 percent, which meant an increase of reserves of nearly six percent. A successful development process enabled Occidental a continuous increase of proven reserves in all core areas (e.g. Elk Hills: at the end of 2003 the amount of proven reserves was 444 million boe compared to 425 million boe at the time of acquisition in 1998).³²⁵ In 2004, the increase of reserves was mainly driven by revisions, especially in the Middle East, and improved recovery, mainly of the Permian Basin.³²⁶ A reserve replacement ratio of 191 percent in 2005 showed again the good performance of Occidental's effort to increase their proven reserves. The main share of the continuous increase had the Elk Hills oil and gas field in California. The proved reserves climbed up to 505 million boe. In contrast to the previous years, acquisitions made up the main part of 2005's additional reserves.³²⁷ In 2006, Occidental added 192.33 million boe to its proven reserves. Proved developed reserves represented approximately 78 percent of Occidental's total proven reserves, compared to 74 percent of the previous year. Like in 2005, the acquisitions of Vintage in Argentina and of assets in the United States made up the main part of the new gained reserves.³²⁸

Although the reserves replacement ratio fell below 100 percent, because of the maturity of the Western Canada fields, in 2002, the volume of proved reserves of Petro-Canada grew by 29 percent or 4.2 billion barrels of oil equivalent in relation to 2001. Reason for the growth of reserves was the acquisition of Veba Oil & Gas.³²⁹ In 2002, the proved oil reserves declined for five percent. The weakness of Petro-Canada was that its core areas are mature, the annual production rose and as a result, the reserves declined continuously.³³⁰ Petro-Canada's proven reserves declined again for nearly one percent. In the last 15 years, the reserves declined approximately for six percent every year. The company replaced 96 percent of its production in 2004, compared to 59 percent in 2003.³³¹ Petro-Canada's reserve replacement rate increased in 2005 to 111 percent compared to 103 percent in 2004. This increase was made possible that in all core areas the volume of proven reserves increased.³³² In 2006, Petro-Canada replaced 134 percent of its annual production

³²¹ see Marathon Oil Corporation, Annual Report 2004

³²² see Marathon Oil Corporation, Annual Report 2005

³²³ see Marathon Oil Corporation, Annual Report 2006

³²⁴ see Occidental Petroleum Corporation, Annual Report 2002

³²⁵ see Occidental Petroleum Corporation, Annual Report-10K 2003

³²⁶ see Occidental Petroleum Corporation, Annual Report-10K 2004

³²⁷ see Occidental Petroleum Corporation, Annual Report-10K 2005

³²⁸ see Occidental Petroleum Corporation, Annual Report-10K 2006

³²⁹ see Petro-Canada, Annual Report 2002

³³⁰ see Petro-Canada, Annual Report 2003

³³¹ see Petro-Canada, Annual Report 2004; PCF Energy, Petro-Canada UCS Strategy & Performance Profile 2004

³³² see Petro-Canada, Annual Report 2005

compared to 111 percent in the previous year. Still 53 percent of the company's reserves are located in North America. The main growth of reserves was in North America, while the international reserves declined because of the sale of the mature Syrian producing assets.³³³

General Trends and the Dependence on the Oil Price

In the average, the total proven reserves of the E&P peer group increased (see Fig. 24). All companies do have the same problem – mature fields, but to avoid a decline of the amount of the oil and gas reserves every company made acquisitions, both acquisitions of new fields and of E&P companies. Because of the trend of continuous increasing oil and gas prices, every peer member tries to secure their reserves to be competitive for the future.

3.4.5 The relation between Reserves and Production

This chapter relates the annual production to the total proved reserves. A further description see chapter 3.1. The result of this relation is shown in Tab. 23. It shows how long a company under the existing conditions will be able to produce. It is a measured variable for the possibility of a company to be competitive in the future.

Reserves/Production	2002	2003	2004	2005	2006
OMV Group	11.29	9.41	8.37	11.07	10.89
Anadarko	11.90	13.08	12.39	15.49	15.58
Apache	10.53	10.87	11.81	12.76	12.65
BG Group	14.11	13.49	12.87	11.92	9.80
Burlington	12.18	12.55	11.64	11.95	/
Hess Corporation	7.07	7.39	8.18	8.77	9.29
Marathon Oil	8.64	7.41	9.38	10.44	9.39
Occidental Oil	12.28	12.36	12.24	13.06	13.24
Petro Canada	11.83	9.27	9.50	10.30	11.53
OMV Austria	11.05	10.56	10.37	11.02	10.48
Peer Average	11.08	10.63	10.68	11.65	11.43

Tab. 23: Total proven Oil and Gas Reserves versus total annual Production

³³³ see Petro-Canada, Annual Report 2006

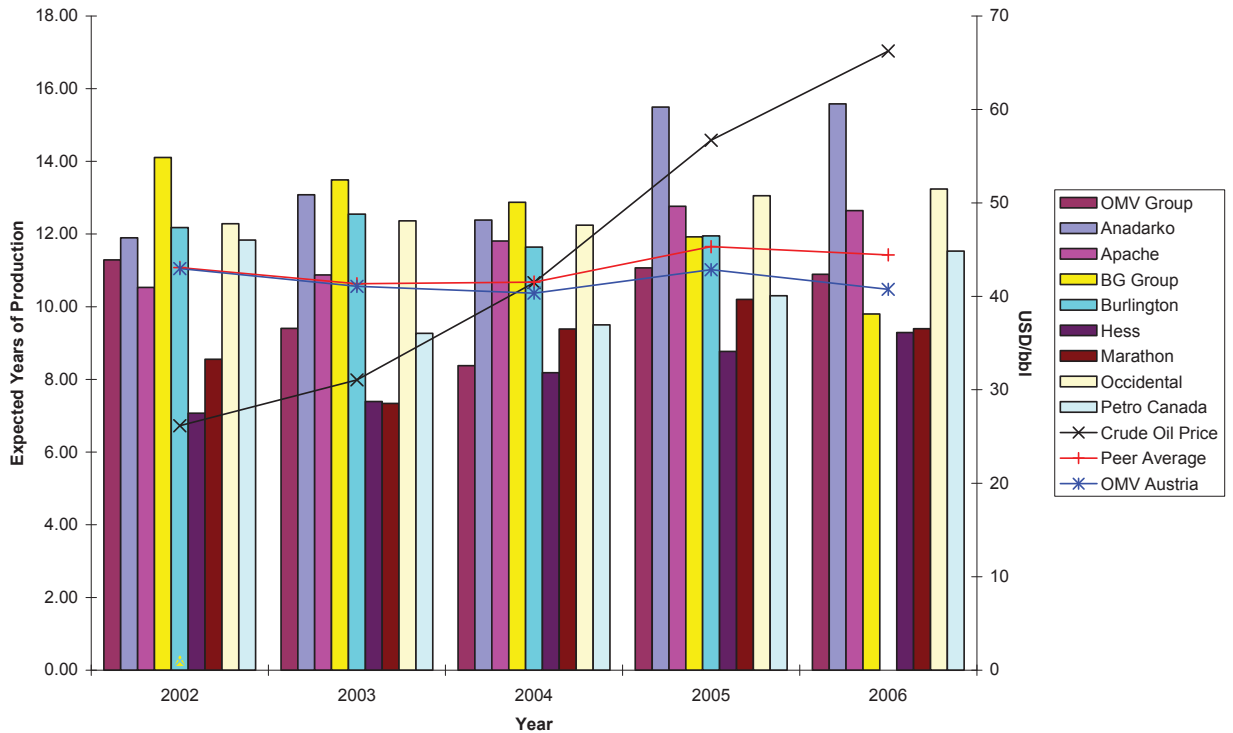


Fig. 25: Ratio between Reserves and Production in expected Years

The average reserve/production ratio changed only marginal between 2002 and 2006. In 2002, the average was 11.088 years of remaining production. In 2006, the average period of production was 11.427 years. That means the companies were able with the help of high reserve replacement ratios, acquisitions and high investment in their E&P segments to increase their volume of reserves or to hold them constant. A look at Tab. 23 shows that some of the companies were more successful with their programs than others.

For the changes of the total annual oil and gas production, see Tab. 21 and Fig. 23. The changes of the total proven oil and gas reserves see Tab. 22 and Fig. 24.

3.4.6 Development of the Capital Expenditures

The definition of the capital expenditures sees in chapter 3.1. This indicator helps to analyse the investment behaviour of the different companies. In Fig. 26, the different companies and their investment activities are shown.

CAPEX, \$MM	2002	2003	2004	2005	2006
OMV Group ³³⁴	641.25	1560.53	2852.87	1790.12	3162.61
Anadarko ³³⁵	2388.00	2792.00	2510.00	2943.00	4594.00
Apache ³³⁶	1288.00	3118.00	3594.00	4011.00	6444.00
BG Group ³³⁷	1769.00	1321.00	2480.00	2539.00	3335.92
Burlington ³³⁸	1837.00	1788.00	1747.00	2687.00	/
Hess Corporation ³³⁹	1534.00	1358.00	1521.00	2341.00	4000.00
Marathon Oil	1663.00	1909.00	2247.00	2890.00	3478.00
Occidental Oil ³⁴⁰	1145.00	1523.00	1720.00	2324.00	3005.00
Petro Canada ³⁴¹	1861.00	2142.00	2675.00	3253.00	3434.00
OMV Austria ³⁴²	32.67	42.59	53.15	79.00	117.22
Peer Average	1415.89	1755.41	2140.00	2485.71	3507.86

Tab. 24: Capital Expenditures in USD Million

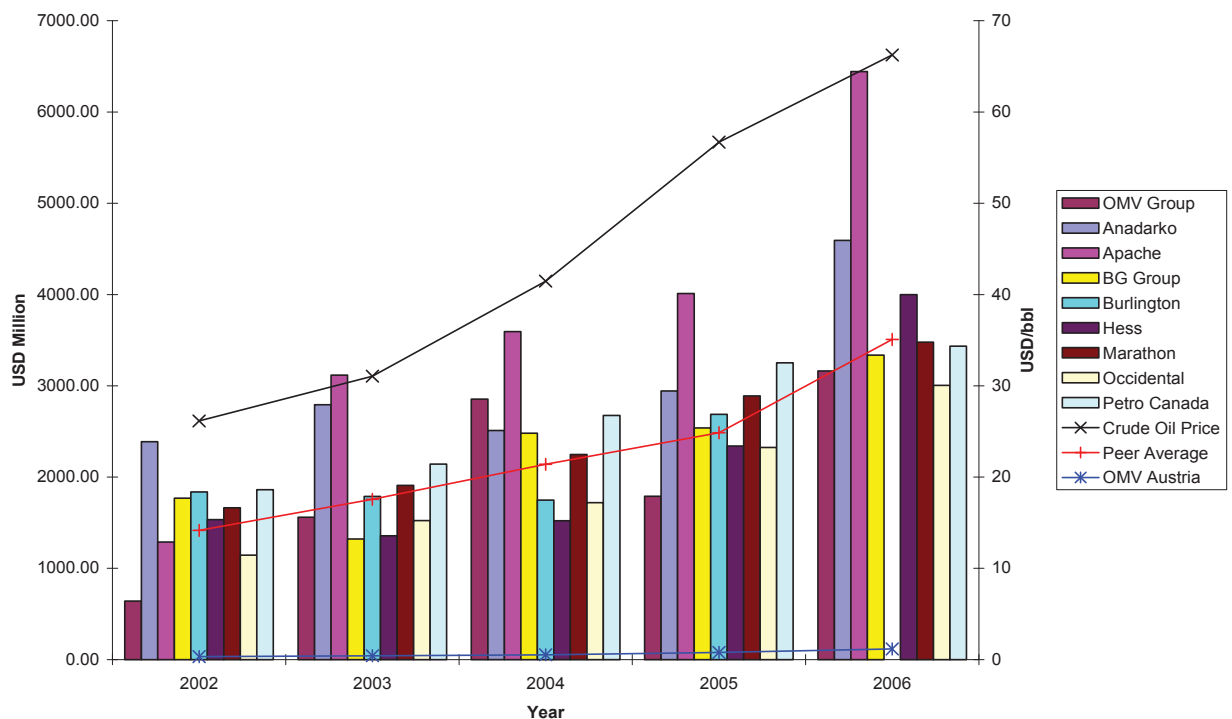


Fig. 26: Capital Expenditure in USD Million versus Time

³³⁴ see OMV, Annual Report 2006, p. 144

³³⁵ see Anadarko Petroleum Corporation, Annual Report 2006, p. 31

³³⁶ see Apache Corporation, Annual Reports 2004, 2006

³³⁷ see PFCEnergy, 2007

³³⁸ see Burlington Resources Inc, Annual Reports 2004, 2005

³³⁹ see PFCEnergy, Upstream Competition Service

³⁴⁰ see Occidental Petroleum Corporation, Annual Report 2006-10K

³⁴¹ see Petro-Canada, Annual Reports 2003, 2006

³⁴² source OMV Austria

Tab. 25 shows the CAPEX in USD divided by the annual production in boe. This indicator displays the investments and spending of a company in relation to the produced hydrocarbons in a year.

CAPEX, \$/boe	2002	2003	2004	2005	2006
OMV Group	21.09	35.79	62.15	14.52	26.71
Anadarko	12.20	14.53	13.13	18.62	23.76
Apache	10.33	20.47	21.91	24.18	35.23
BG Group	13.00	8.47	14.87	13.86	15.21
Burlington	11.75	11.45	10.16	15.43	/
Hess Corporation	9.08	9.70	11.90	18.78	29.89
Marathon Oil	11.20	13.57	18.52	23.31	25.89
Occidental Oil	6.08	7.62	8.32	11.21	13.72
Petro Canada	17.07	16.27	20.95	27.20	31.08
OMV Austria	2.32	2.95	3.71	5.78	8.37
Peer Average	11.40	14.07	18.56	17.23	23.32

Tab. 25: Capital Expenditures divided by total annual Production in USD/boe

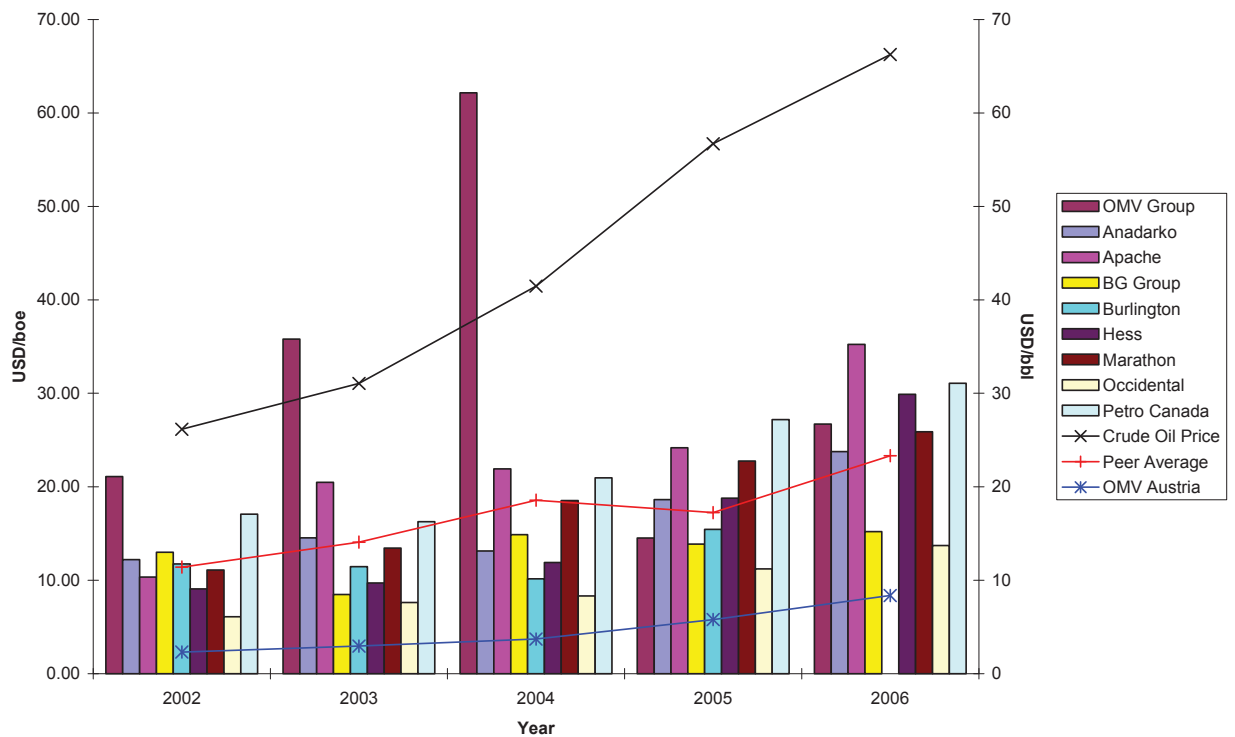


Fig. 27: Capital Expenditures per boe versus Time

The Development of the individual Companies

In 2002, Anadarko's capital expenditures increased by 28 percent compared to 2001. Drivers were acquisitions in Wyoming and Qatar where significant production and reserves growth were expected, but also large investments in the development of the core areas.³⁴³ Anadarko's increase of the 2003's CAPEX was driven by the beginning of the construction of the first production facilities in Algeria, deepwater projects in the Gulf of Mexico, EOR programs in Wyoming, coal bed methane projects in the United States and growth projects that should bring an increase of production within the next five years.³⁴⁴ The increase of the year 2005 was given by higher exploration costs in the deepwater Gulf of Mexico and rising service and material costs.³⁴⁵ In 2006, the CAPEX increased 56 percent compared to 2005. Main drivers for this rise were an increase in exploration lease acquisitions, offshore drilling completions, developments in infrastructure and by the acquisitions of Kerr-McGee Corporation and the Western Gas Resources, Inc.³⁴⁶

In 2003, Apaches' capital expenditures rose to more than 3 billion USD. They balanced between exploration and development activity and acquisitions in the North Sea and the Gulf of Mexico. The entry into the United Kingdom sector of the North Sea brought Apache a new core area. In total, the acquisitions were 1.6 billion USD.³⁴⁷ The year 2004 was a year of acquisitions and of additions to property and equipment, which is why the CAPEX significantly rose. Apache acquired assets of ExxonMobil in the Permian Basin of West Texas and New Mexico and from Anadarko assets in the Gulf of Mexico.³⁴⁸ An intensive exploration and development program in the Gulf of Mexico and in Canada drove the increase of 2005. Apache drilled more than 1000 wells in Canada.³⁴⁹ In 2006, the increase of Apache's CAPEX in 2006 was given by investments for acquisitions and development activities.³⁵⁰

The main driver of BG Group's capital expenditures was the exploration and production sector, which made up nearly 85 percent of the invested capital, in 2002. Another important part 2002's CAPEX was the acquisition of an oil and gas field in India.³⁵¹ BG Group's CAPEX sunk for nearly 25 percent in 2003. The decrease could be explained by an decrease of the exploration and production investments. With selective investment, the company tried to add new value to its assets. The focused areas were Kazakhstan, Egypt and LNG projects in Egypt, the Atlantic LNG expansion in Trinidad and the Comgas network in Brazil.³⁵² In 2004, capital investments increased again. Their main investments took place in Kazakhstan, Egypt, UK North Sea, and Tunisia, but also several acquisitions of subsidiary undertakings in Canada, Mauritania, and Trinidad were included.³⁵³ The increase of 2005's CAPEX had several reasons. The BG Group acquired the remaining 50 percent interest of Brindisi LNG SpA in Italy and the E&P segment invested nearly 50 percent of the total CAPEX in the United Kingdom, Egypt, Kazakhstan, and Mauritania for development projects.³⁵⁴ In 2006, the capital expenditure rose again (see Tab.20).

³⁴³ see Anadarko Petroleum Corporation, Annual Report 2002

³⁴⁴ see Anadarko Petroleum Corporation, Annual Report 2003

³⁴⁵ see Anadarko Petroleum Corporation, Annual Report 2005, p. 40

³⁴⁶ see Anadarko Petroleum Corporation, Annual Report 2006, p. 48

³⁴⁷ see Apache Corporation, Annual Report 2003

³⁴⁸ see Apache Corporation, Annual Report 2004

³⁴⁹ see Apache Corporation, Annual Report 2005

³⁵⁰ see Apache Corporation, Annual Report 2006, p. 14

³⁵¹ see BG Group, Annual Report and Accounts 2002

³⁵² see BG Group, Annual Report, 2003

³⁵³ see BG Group, 2007

³⁵⁴ see BG Group, Annual Report 2005

Higher investments in the E&P segment and in the company's liquid natural gas (LNG) projects increased the CAPEX.³⁵⁵

In 2002, the worldwide capital expenditures of Burlington for oil and gas activities included 49 percent for development, 13 percent for exploration, and 38 percent for proved property acquisitions.³⁵⁶ The worldwide capital expenditures of 2003 went down 3 percent and had a value of 1.788 billion USD (see Tab. 24). This included 67 percent associated with development, 19 percent for exploration, and 14 percent for proved property acquisitions. The high investments in development focused to add adequate reserves and to achieve the target of three to eight percent average annual production growth.³⁵⁷ In 2004, the CAPEX included 78 percent for development, 17 percent of exploration, and five percent for proved property acquisitions. Again, the capital expenditures were down two percent.³⁵⁸ The capital expenditures increased in 2005 by 54 percent (see Tab. 24). The CAPEX included 70 percent for development, 18 percent for exploration, and 12 percent for acquisitions in the Fort Worth basin in Texas.³⁵⁹ For 2006, there exists no annual report. The reason was that the Burlington Resources company was taken over by ConocoPhillips.

The main part of 2002 CAPEX of Hess (1.095 billion USD) was invested in production and development activities. The company's strategy was to shift their capital expenditures from exploration and production to field developments. Another part was invested in a 50 percent joint venture with Petroleos de Venezuela, S.A. (PDVSA).³⁶⁰ In 2003, 56 percent of Hess capital expenditures went into field developments. Hess invested its capital in 12 field developments in the deepwater Gulf of Mexico, West Africa, North Sea, and Southeast Asia.³⁶¹ The capital and exploratory expenditures in 2005 totalled 2.341 billion USD (see Tab. 24), of which nearly 90 percent was invested in Exploration and Production and about 100 million USD in Refining and Marketing.³⁶² Like the year before, in 2006, most of the capital expenditures were used for Exploration and Production. During the year, Hess acquired new acreage in Egypt, Ghana, Norway, Ireland, Russia, Brazil, Peru, and a 28 percent interest in the Genghis Khan Field in the deepwater Gulf of Mexico.³⁶³

In relation to 2001, Marathon's CAPEX of 2002 increased because of the acquisition of the Equatorial Guinea CMS Energy and Globex Company, the acquisition and successful integration of Equatorial Guinea projects and the acquisition of additional upstream interests in Norway. The spending in the E&P segment decreased where the spending in the refining, marketing, and trading segment increased. Nearly 55 percent of the 2002 CAPEX were invested in development operations and nearly 20 percent were spent in exploration activities. Reasons for this development were the strategy to drill more low-risk wells and therefore a fewer number of wells. The main investments were done in West Africa, especially the construction of a pipeline in Gabon, and the United States.³⁶⁴ The acquisition of the Russian Khanti-Mansiysk Oil Corporation (KMOC) in 2003, expansion

³⁵⁵ see BG Group, Annual Report 2006

³⁵⁶ see Burlington Resources, Annual Report 2002

³⁵⁷ see Burlington Resources, Annual Report 2003

³⁵⁸ see Burlington Resources, Annual Report 2004

³⁵⁹ see Burlington Resources, Annual Report 2005

³⁶⁰ see Amerada Hess, Annual Report 2002

³⁶¹ see Amerada Hess, Annual Report 2003

³⁶² see Amerada Hess, Annual Report 2005

³⁶³ see Amerada Hess, Annual Report 2006

³⁶⁴ see Herold, S. John, Marathon Oil, Strategic Evaluation, October 2003; Marathon Oil Corporation, Annual Report 2002

in Equatorial Guinea, high investments in pipelines and high investments in refinery upgrades drove the CAPEX into new heights.³⁶⁵ The capital expenditures of 2004 were invested by 43 percent into the upstream sector, 22 percent in integrated gas, and 35 percent into the downstream activities. The increase mainly resulted from increasing spending in the integrated gas segment with the LNG project in Equatorial Guinea.³⁶⁶ Related to 2005 the investments in the upstream segment increased by eight percent to 51 percent, where the integrated gas segment had a percentage of 20 percent and the downstream decreased to 29 percent. The increase of 643 million USD compared to 2004 mainly resulted from increased spending in the E&P segment related to the Alveim development offshore Norway and in the integrated gas segment associated with the Equatorial Guinea's LNG project.³⁶⁷ The increase in 2006 CAPEX was driven by the acquisition of the Petroleum Development Corporation Piceance Basin acreage in the United States, refinery expansion and an increase of upstream development activities mainly in the United States.³⁶⁸

Occidental focused with its capital expenditures of 1.145 billion USD in 2002, to add profitable barrels to its oil and gas production stream and reserve base.³⁶⁹ In 2003, the capital expenditures increased to 1.523 billion USD. The main driver was higher investment in field development. In addition, the spending in the chemical segment increased because of the purchase of a previously leased facility in LaPorte, Texas.³⁷⁰ The biggest part of Occidental's capital expenditures of 2004 was the development segment with 1.438 billion USD, which meant an increase of 341 million USD compared to 2003.³⁷¹ In 2005, Occidental acquired three chlor-alkali chemical manufacturing facilities from Vulcan Chemical.³⁷² In 2006, the company bought Vintage Petroleum's production assets in Argentina.³⁷³

The increase of Petro-Canada's CAPEX in relation to 2001 was mainly driven by the acquisition of Veba Oil & Gas, which created a new core international business. The largest part of the company's investments was taken in the oil sands business.³⁷⁴ In 2003, the capital expenditures of Petro-Canada reached 2142 million USD. These investments included 472 millions for exploration and development for natural gas in Canada and the United States and 344 million USD for exploration and development of crude oil offshore Canada's East Coast. The spending were above plan due to increased development drilling. For the development of oil sands, the expenditures reached 448 million USD and for the international areas of interest, 525 millions were spent.³⁷⁵ The third time in a row the capital expenditures rose. One reason for the increase in 2004, the downstream activities had the highest impact to the risen CAPEX. The amount of 839 million USD were associated primarily with sulphur-in diesel regulations to produce cleaner burning diesel fuels. Another reason was the acquisition of the Prima Energy Corporation, which made up 644 million USD.³⁷⁶ In 2005, the main acquisition of Petro-Canada was a 55 percent interest in

³⁶⁵ see Marathon Oil Corporation, Annual Report 2003

³⁶⁶ see Marathon Oil Corporation, Annual Report 2004

³⁶⁷ see Marathon Oil, Corporation, Annual Report 2005

³⁶⁸ see CAPEX Definition of Oilvoice, 2007

³⁶⁹ see Occidental Petroleum Corporation, Annual Report 2002

³⁷⁰ see Occidental Petroleum Corporation, Annual Report 2003-10K

³⁷¹ see Occidental Petroleum Corporation, Annual Report 2004-10K

³⁷² see Occidental Petroleum Corporation, 2007

³⁷³ see Occidental Petroleum Corporation, 2007

³⁷⁴ see Petro-Canada, Annual Report 2002

³⁷⁵ see Petro-Canada, Annual Report 2003

³⁷⁶ see Petro-Canada, Annual Report 2004

the Fort Hills mining project, which is again an oil sand project. The main drivers for the risen capital expenditures were higher investments in North America for natural gas development and oil sand projects and in the North Sea.³⁷⁷ In relation to 2005, the capital expenditures increased in 2006 mainly in North America for the company's natural gas developments and in the development of the North Sea assets.³⁷⁸

General Trends and the Dependence on the Oil Price

The development of the average CAPEX of the E&P peer members nearly rose parallel to the increasing crude oil price. The high oil prices that had a positive effect on the profits of the companies had also a positive effect on the level of the investments. A trend that all companies had in common was the acquisition of competitors or other oil companies to increase their amount of reserves. Another strategy to improve the level of reserves was the high investments in their E&P segments.

3.4.7 Development of the Return on Average Capital Employed

A detailed explanation and description of the performance indicator return on average capital employed (ROACE) is seen in chapter 3.1. The development of the ROACE is shown in the table below.

ROACE, %	2002	2003	2004	2005	2006
OMV Group ³⁷⁹	11.00	12.00	15.00	20.00	18.00
Anadarko ³⁸⁰	8.14	11.12	13.70	18.66	20.09
Apache ³⁸¹	8.77	14.61	17.73	22.93	17.83
BG Group ³⁸²	10.90	16.30	17.30	22.60	26.00
Burlington ³⁸³	8.62	16.45	16.89	24.43	/
Hess Corporation ³⁸⁴	0.51	8.83	12.05	14.02	18.32
Marathon Oil ³⁸⁵	7.64	14.76	14.07	22.68	30.36
Occidental Oil ³⁸⁶	10.80	15.08	20.79	33.76	21.95
Petro Canada ³⁸⁷	14.14	19.04	16.50	15.39	14.40
Peer Average	8.95	14.24	16.00	21.61	20.87

Tab. 26: Return of Average Capital Employed in Percent

³⁷⁷ see Petro-Canada, Annual Report 2005

³⁷⁸ see Petro-Canada, Annual Report 2006

³⁷⁹ see OMV, Annual Report 2006, p. 3

³⁸⁰ see Herold Database, 2007

³⁸¹ see Apache Corporation, Annual Report 2006, p. 2

³⁸² see BG Group, 2007

³⁸³ see Herold Database, 2007

³⁸⁴ see Herold Database, 2007

³⁸⁵ see Herold Company Financial Summary Marathon Oil Corporation, 2007, p. 3

³⁸⁶ see Herold Database, 2007

³⁸⁷ see Herold Database, 2007

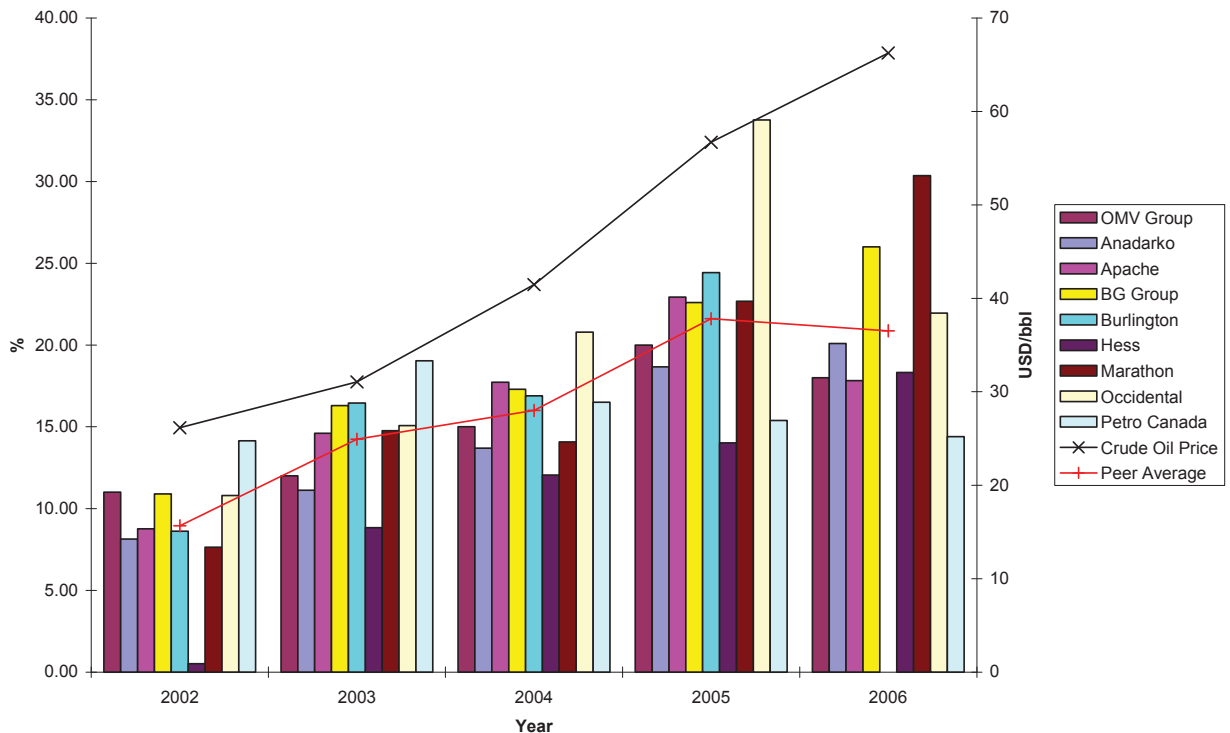


Fig. 28: Return of Average Capital Employed in Percent versus Time

For most of the companies of the E&P Peer Group, the ROACE showed a positive trend as shown in Fig. 28 above.

The Development of the individual Companies

The development of OMV's ROACE is analysed in chapter 3.3.7.

The decrease of Apache's ROACE in 2006 was conditioned by high investments to repair the damages the hurricane season left on Apache's assets in the Gulf of Mexico.³⁸⁸ The developments of the capital expenditures see in Tab. 24.

In 2006, the ROACE of Occidental sunk from 33.76 percent in 2005 to 21.95 percent. Responsible for this development were changes in Occidental's accountings and the decline of sales because of the divestment in Russia.³⁸⁹

Reasons for the continuous decline of Petro-Canada's ROACE since 2004 were the capital-intensive development of non-conventional resources, such as oil sands, and the tight market for labour and materials in the company's Canadian core region.³⁹⁰

General Trends and the Dependence on the Oil Price

Until the year 2005, the average ROACE and the crude oil price grew simultaneous (see Fig. 28). In 2006, the high amount of investments and the high capital expenditures led to an decrease of the average return on average capital employed.

³⁸⁸ see Apache Corporation, Annual Report 2006

³⁸⁹ see Occidental Petroleum Corporation, Annual Report 2006 10-K

³⁹⁰ see PFCEnergy, Strategy & Performance Profile, Petro-Canada, December 2006

3.4.8 Development of the Finding Costs

The definition and explanation of the “finding costs” is found in chapter 3.1. This indicator shows the performance of the cost efficiency of the exploration and production segment of a company. How the finding costs evolve between 2002 and 2006 shows Tab. 27 below.

Finding Costs, \$/boe	2002	2003	2004	2005	2006
OMV Group ³⁹¹	2.26	2.59	1.63	1.80	2.30
Anadarko ³⁹²	7.63	4.82	3.81	2.98	34.41
Apache ³⁹³	1.50	1.81	1.88	1.79	2.58
BG Group ³⁹⁴	0.94	0.99	2.00	2.76	4.86
Burlington ³⁹⁵	3.32	3.06	1.43	1.69	/
Hess ³⁹⁶	12.06	14.77	6.24	4.28	5.76
Marathon ³⁹⁷	14.10	6.06	2.67	3.43	4.27
Occidental ³⁹⁸	1.81	1.70	1.40	2.59	9.07
Petro Canada ³⁹⁹	2.23	2.25	3.16	3.47	2.66
OMV Austria ⁴⁰⁰	2.22	2.22	1.85	1.86	4.05
Peer Average	4.81	4.03	2.61	2.66	7.77

Tab. 27: Finding Costs in USD per boe

³⁹¹ see OMV, Annual Report 2006, p. 143

³⁹² source PFCEnergy Upstream Competition Service, Anadarko, 2007

³⁹³ source PFCEnergy Upstream Competition Service, Anadarko, 2007

³⁹⁴ source PFCEnergy Upstream Competition Service, Anadarko, 2007

³⁹⁵ source PFCEnergy Upstream Competition Service, Burlington

³⁹⁶ source PFCEnergy Upstream Competition Service, Anadarko, 2007

³⁹⁷ source PFCEnergy Upstream Competition Service, Anadarko, 2007

³⁹⁸ source PFCEnergy Upstream Competition Service, Anadarko, 2007

³⁹⁹ source PFCEnergy Upstream Competition Service, Anadarko, 2007

⁴⁰⁰ source OMV Austria

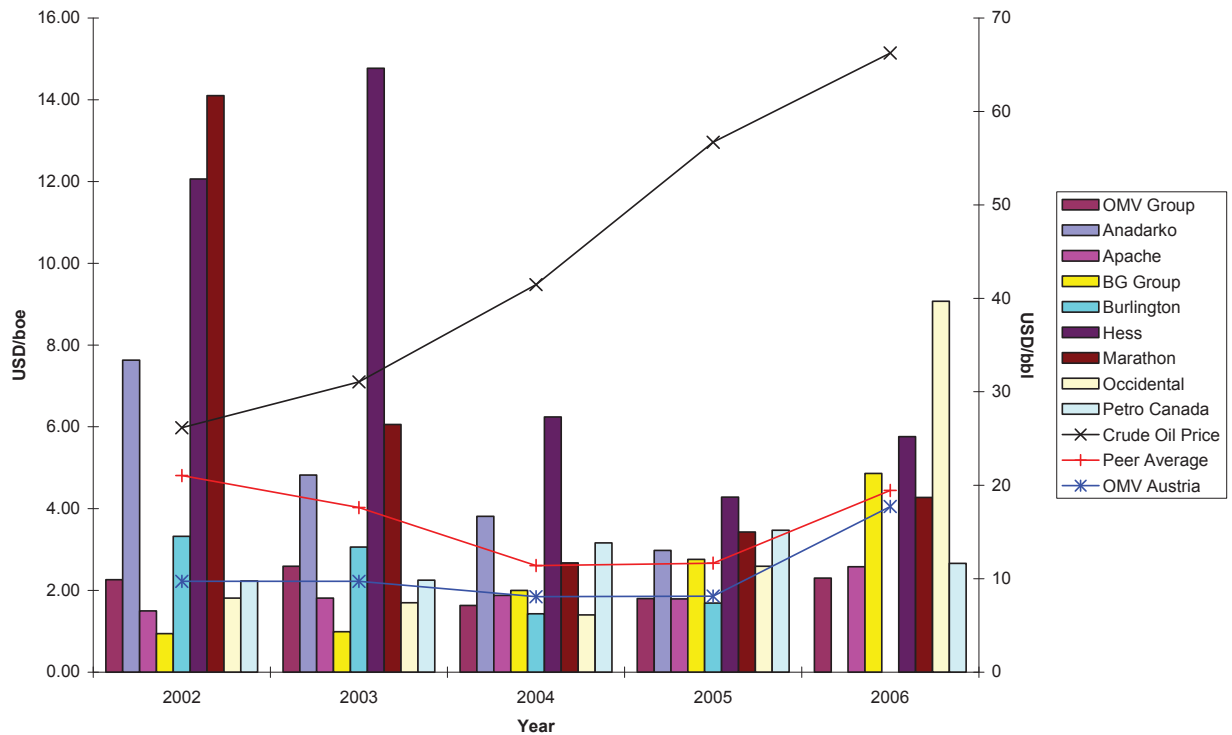


Fig. 29: Finding Costs in USD/boe versus Time

The Development of the individual Companies

The development of OMV's finding cost see chapter 3.3.8.

Anadarko's finding costs were influenced by the large number of undeveloped reserves acquired through transactions, and the concomitant rise in exploration spending partly as a function of the tight market for drilling rigs and other oil-field services.⁴⁰¹

Apache was able to hold their finding costs on a very low and competitive level (see Tab. 27). Main driver was Apache's core region in Egypt (19 percent of worldwide production, 13 percent of reserves), where the regional finding costs was a low \$0.85/boe in 2005.⁴⁰²

Reason for the high increase of finding costs of the BG Group in 2005 and 2006 was driven by interests offshore in the North Sea, the competitive market in the service sector with its increased costs, and the high investments for its new core and business area of LNG in Equatorial Guinea.⁴⁰³

During the years, 2002 and 2003 the finding costs of Hess increased, because of negative net revisions and average internal reserve replacement rates of only 25 percent.⁴⁰⁴ The increase in Hess finding costs from 2004 until 2006 was necessary to stem the continuous decline in the company's annual production (see Tab. 21) and total proven reserves (see Tab. 22).⁴⁰⁵

⁴⁰¹ see PFCEnergy, Strategy & Performance Profile, Anadarko, November 2006

⁴⁰² see PFCEnergy, Strategy & Performance Profile, Apache corporation, December 2006

⁴⁰³ see PFCEnergy, Strategy & Performance Profile, BG Group, December 2006

⁴⁰⁴ see PFCEnergy, Strategy & Performance Profile, Hess Corporation, 2004

⁴⁰⁵ see PFCEnergy, Strategy & Performance Profile, Hess Corporation, December 2006

Marathon had progressively rebuilt its reserves base, established strong growth positions in North and West Africa, and brought its finding costs back to more levels that are competitive then in the years before where negative net revisions and average internal reserves replacement rates of only 50 percent increased the company's costs.⁴⁰⁶

The cost of reserve purchases had exceeded Petro Canada's finding costs for the past years (see Tab. 27), but they remained the lowest of the Canadian peers.⁴⁰⁷

3.4.9 Development of the Production Costs

The definition of production costs is given in chapter 3.1. With the help of this indicator, the economical situation how a company produces can be shown. It has also an influence on the EBIT, because if the production costs are high, the profit of the sales will be small. Tab. 28 shows the development for each company during the period 2002 to 2006.

Production Costs, \$/boe	2002	2003	2004	2005	2006
OMV Group ⁴⁰⁸	6.18	5.77	5.87	9.82	11.10
Anadarko ⁴⁰⁹	4.92	5.14	5.56	6.40	7.90
Apache ⁴¹⁰	3.72	4.47	5.16	9.48	10.92
BG Group ⁴¹¹	2.76	2.82	3.00	3.13	3.34
Burlington ⁴¹²	3.01	3.43	4.09	4.98	/
Hess ⁴¹³	4.20	4.73	5.49	6.76	7.98
Marathon ⁴¹⁴	3.90	4.95	5.75	7.26	6.48
Occidental ⁴¹⁵	5.33	5.81	6.20	7.26	9.14
Petro Canada ⁴¹⁶	4.22	6.31	8.37	11.44	15.15
OMV Austria ⁴¹⁷	5.64	5.47	6.54	6.33	6.78
Peer Average	4.39	4.89	5.60	7.29	8.75

Tab. 28: Production Costs in USD per boe

⁴⁰⁶ see PFCEnergy, Strategy & Performance Profile, Marathon Oil, 2004, 2006

⁴⁰⁷ see PFCEnergy, Strategy & Performance Profile, Petro-Canada, December 2006

⁴⁰⁸ see OMV, Annual Report 2004, p.143

⁴⁰⁹ source PFCEnergy Upstream Competition Service, Anadarko, 2007

⁴¹⁰ source PFCEnergy Upstream Competition Service, Anadarko, 2007

⁴¹¹ source PFCEnergy Upstream Competition Service, Anadarko, 2007

⁴¹² source PFCEnergy Upstream Competition Service, Burlington

⁴¹³ source PFCEnergy Upstream Competition Service, Anadarko, 2007

⁴¹⁴ see Marathon Oil Corporation, Annual Report 2002 – 2006

⁴¹⁵ source PFCEnergy Upstream Competition Service, Anadarko, 2007

⁴¹⁶ source PFCEnergy Upstream Competition Service, Anadarko, 2007

⁴¹⁷ source OMV Austria

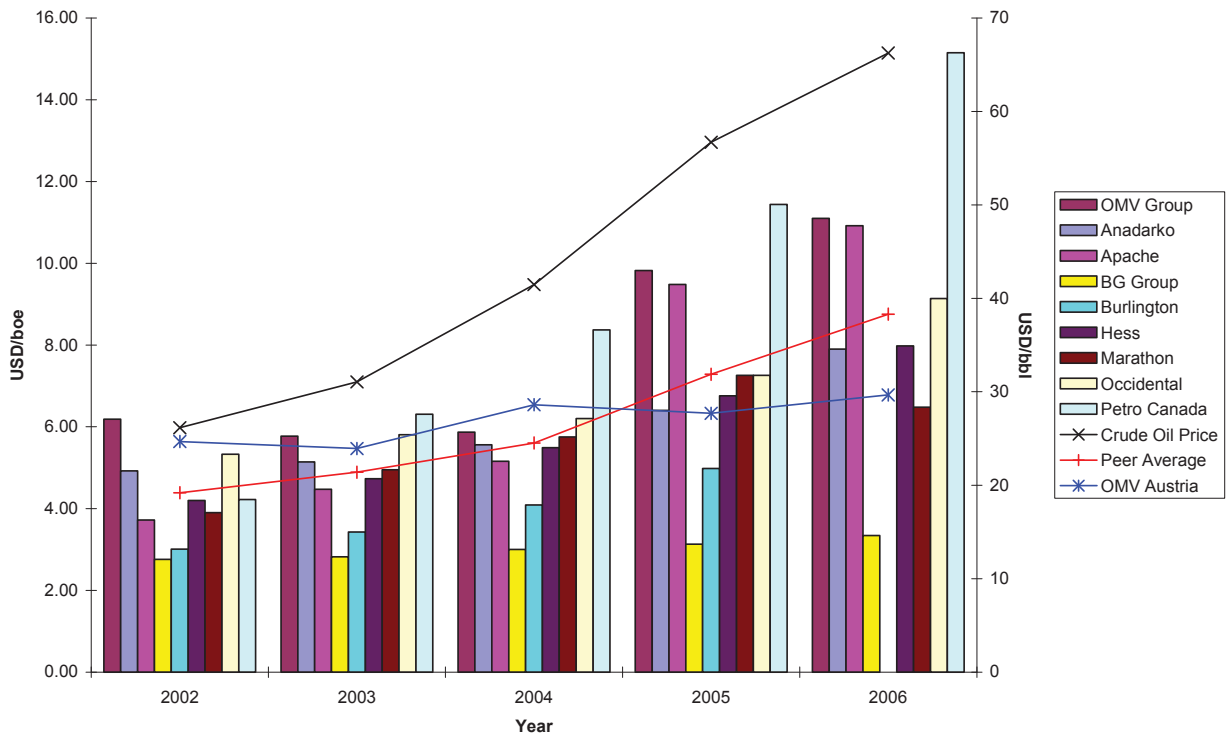


Fig. 30: Production Costs in USD/boe versus Time

The Development of the individual Companies

The interpretation of OMV's production costs see chapter 3.3.9.

Apache's European assets especially in the UK North Sea were the main driver of the increasing company's production costs.⁴¹⁸

Production costs of the Hess Corporation increased because of a portfolio focus on high cost areas of operation. As other companies of the E&P Peer group, Hess production declined within the last years and so the production costs pushed the production costs per boe steadily higher. The European assets of Hess were the main driver for this development.⁴¹⁹

The increase of Marathon's production costs in 2002 was driven by significant increases in investments in all operational areas and the company's core areas. Especially limited upside potentials and high production costs were responsible.⁴²⁰ The company's production cost increased between 2002 and 2006 for nearly 166 percent (see Tab. 28). The reasons were the impact of an industry-wide cost pressure, declining production, and increasing exposure to the non-conventional resource opportunities.⁴²¹

Occidental executed an admirably enhanced oil recovery (EOR) strategy to gain access to intensive mature assets that led to a relatively low production costs. In 2005, the strategy started breaking down because of EOR cost inflation, the production costs increased and

⁴¹⁸ see PFCEnergy Upstream Competition Service, Apache

⁴¹⁹ see PFCEnergy Upstream Competition Service, Hess

⁴²⁰ see Marathon Oil Corporation, Annual Report 2002, p. 5

⁴²¹ see PFCEnergy Upstream Competition Service, Marathon

the acquisition for proved reserves too. The ownership of a large infrastructure in the United States including the Centurion pipeline and a CO₂ field in northern New Mexico let the costs increase.⁴²²

The continuous increase of Petro-Canada's production cost between 2002 and 2006 (see Tab. 28) was related to increasing costs at the company's in situ bitumen developments and additional maintenance work requirements.⁴²³

General Trends and the Dependence on the Oil Price

The average production costs increased continuously (see Fig. 30). A reason for this increase was the rising crude oil price and the resulting risen production and service costs.

⁴²² see PFC Energy Upstream Competition Service, Occidental

⁴²³ see PFC Energy Upstream Competition Service, Petro-Canada, November 2007

4 Benchmarking Study

After the theoretical part about benchmarking and the analysis of the companies, follows the benchmarking study. In this case, it is a competition and performance benchmarking to identify the most successful company in the peer groups.

4.1 Benchmarking with the Central Eastern Europe Companies

The OMV Austria is included into the benchmarking process, but this has to be seen critical. The comparison of a subsidiary with integrated companies will always lead to limitations. At the comparison with absolute performance indicators like the EBIT or CAPEX, a subsidiary never will be competitive. Higher possibilities to gain convincing statements for benchmarking are the relative performance indicators or the change of the absolute performance indicators expressed as percentages (e.g. the change of the total annual proven reserves between two following years expressed as percentage of growth or decline). This will lead to relationships and features that will allow a direct comparison.

Earnings before Interest and Taxes

The EBIT is an absolute performance indicator. It is influenced by the annual production, the average crude oil price, the production costs, and the refining margins. Nevertheless, the impact of the downstream is only marginal. For example, in 2007 the share of the refining and marketing segment of the OMV Group was lower than five percent.⁴²⁴

In comparison to its CEE peers, the OMV Group (without the impact of Petrom) lost its leading position in 2006. Tab. 9 shows the development of the CEE's EBIT between 2002 and 2006 and Tab. 29 shows the change of the companies ranking.

	EBIT, \$MM	2002	EBIT, \$MM	2006	EBIT, \$MM	2006
1	OMV Group*	470.25	MOL	1748.4	OMV Group	2588.62
2	MOL	328.11	OMV Group*	1367.35	MOL	1748.40
3	OMV Austria	182.68	Petrom	1081.55	Petrom	1081.55
4	INA	100	OMV Austria	329.5	OMV Austria	329.5
5	Petrom	86.43	INA	278	INA	278

Tab. 29: Ranking of the CEE Companies in 2002 and 2006

OMV Group* without Petrom.

⁴²⁴ see OMV Bilanz 2007

EBIT, Change in %	2003	2004	2005	2006
OMV Group	54.75	58.04	111.79	6.28
OMV Group*	54.75	58.04	48.74	-20.07
Petrom	62.53	42.33	203.18	78.41
INA	105.71	45.11	-6.39	-0.51
MOL	14.23	260.74	6.32	21.63
OMV Austria	1.07	-17.97	78.53	21.87
Peer Average	39.91	92.98	36.55	11.63

Tab. 30: Change of the EBIT per Year expressed as Percentage

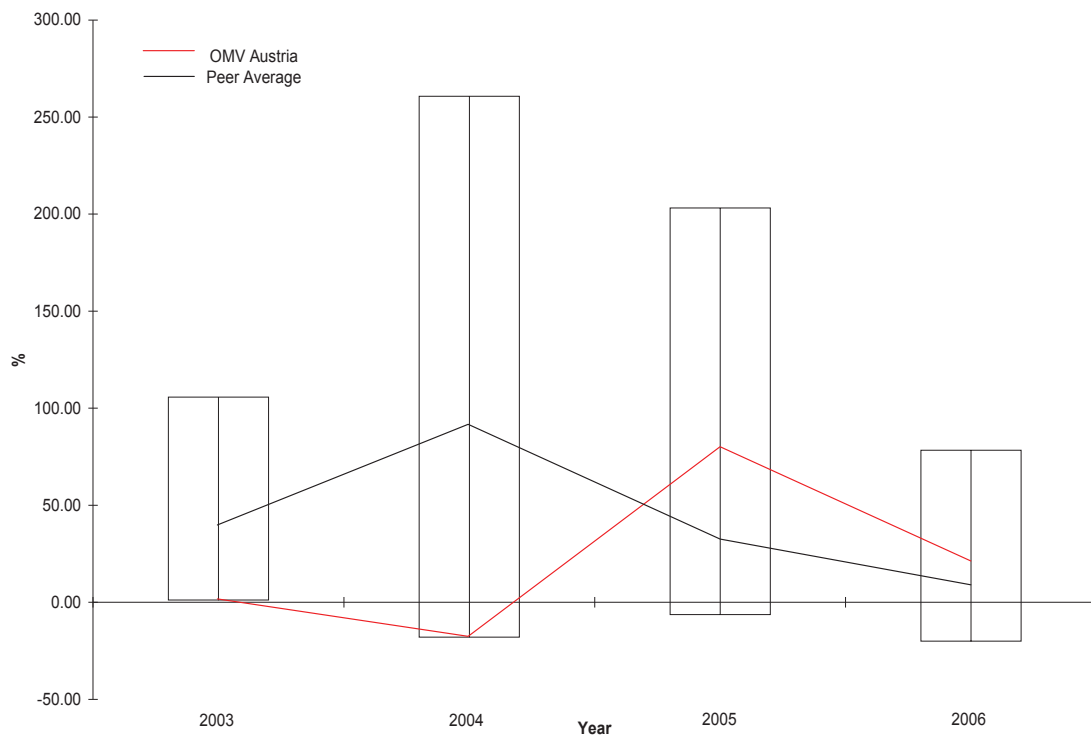


Fig. 31: Change of the CEE Peer Members EBIT expressed

The Fig. 32 above shows the range of the minimum and maximum changes of the CEE peers members EBIT per year in percent. The peer group members range between this minima and maxima. The black line is the trend of the average change of the EBIT in percent and the red line is the development of OMV Austria's EBIT.

For the oil companies it is nearly impossible to influence key factors like the crude oil and natural gas prices, the developments at the spot-market, the exchange rates of the USD dollar or the development of the refining margins. All these factors do have a direct or indirect influence on the EBIT. Options to gain higher profits are the increase of the daily production, if the oil price is at a high level, and a strict program of cost control.

The EBIT expressed as absolute performance indicator shows that the OMV Group (with Petrom) is the leading company in the CEE area because it is the largest of the companies

and has the highest EBIT per year (see Tab. 29). But, if the EBIT is expressed as percentage and so turned into an relative performance indicator the comparison shows another result (see Tab. 30). Except of the Romanian Petrom with an increase of 78 percent, the OMV Austria showed the best performance in 2006 with an increase of its EBIT by more than 20 percent. The trend of the average change of the EBIT shows a continuous decrease since 2004 (see Fig. 32). This only means that the EBIT still increases but not as high as in the past. The OMV Austria was able to stay above the average and showed their possibility to increase their profits related to the average of the peer members. The increase of the EBIT followed relative to the increasing oil prices (see Fig. 12).

The EBIT/boe is a relative performance indicator. It is the relationship between the annual EBIT and the annual oil and gas production.

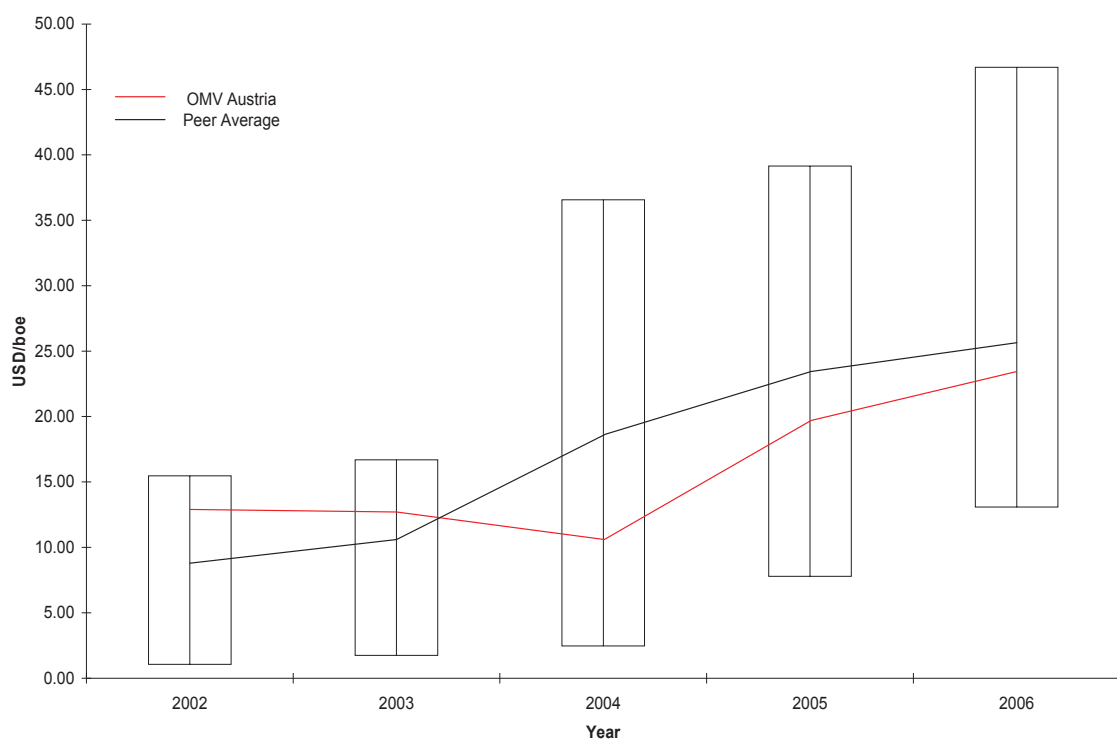


Fig. 32: OMV Austria related to the CEE Peers EBIT per boe

The graph above shows the range of the minimum and maximum annual EBIT/boe. The black line is the behaviour of the average EBIT/boe of the CEE peer members and the red line is the trend of the OMV Austria. While the OMV Austria was in 2002 and 2003 above the average trend, it fell below the average since 2004. The best performer is MOL with the highest earnings per produced boe of the peer group (see Tab. 10). The graph also shows that the minima and maxima EBIT/boe continuously increased since 2002. Even if a company lies in the area of the minimum, it was able to gain higher profits per boe.

Total annual oil and gas production

The total annual oil and gas production is an absolute performance indicator. The meaningfulness of this indicator for the OMV Austria is limited, because of the fact that the OMV Austria is only a subsidiary (see Tab. 31).

To get a better overview of this indicator the annual change of the production in percent is chosen to make statements about the development and trend of the OMV Austria related to the CEE peer members (see Fig. 34).

Total Oil & Gas Production, MMboe/yr	2002	2003	2004	2005	2006
OMV Group*	3	2	2	2	2
OMV Group	3	2	2	1	1
Petrom	1	1	1	1	1
INA	4	4	4	4	4
MOL	2	3	3	3	3
OMV Austria	5	5	5	5	5

OMV Group* is without the impact of Petrom

Tab. 31: CEE Peer Members ranked to their annual Production

The OMV Group without the impact of Petrom would show a theoretical performance ranking as shown in Tab. 31 in the first column. But, since 2004, Petrom is an integrated part of the OMV Group and the ranking changed in 2005 and the OMV Group became the leading company within the CEE peer group.

Fig. 33 shows the minimum and maximum change in percent of the annual oil and gas production. The black line represents the average change of production and the red line shows the behaviour of the OMV Austria within the CEE peer group. The graph shows that the average trend of production is more or less negative this means that the annual production of the CEE peer group members decreased in the average.

The red line, which represents the behaviour of the OMV Austria, follows the average trend of declining production until 2006. During 2006, the production increased again and the OMV Austria was able to produce above the average (see Fig. 34). The only company that has an increasing production during the years is the Hungarian MOL (see Fig. 14).

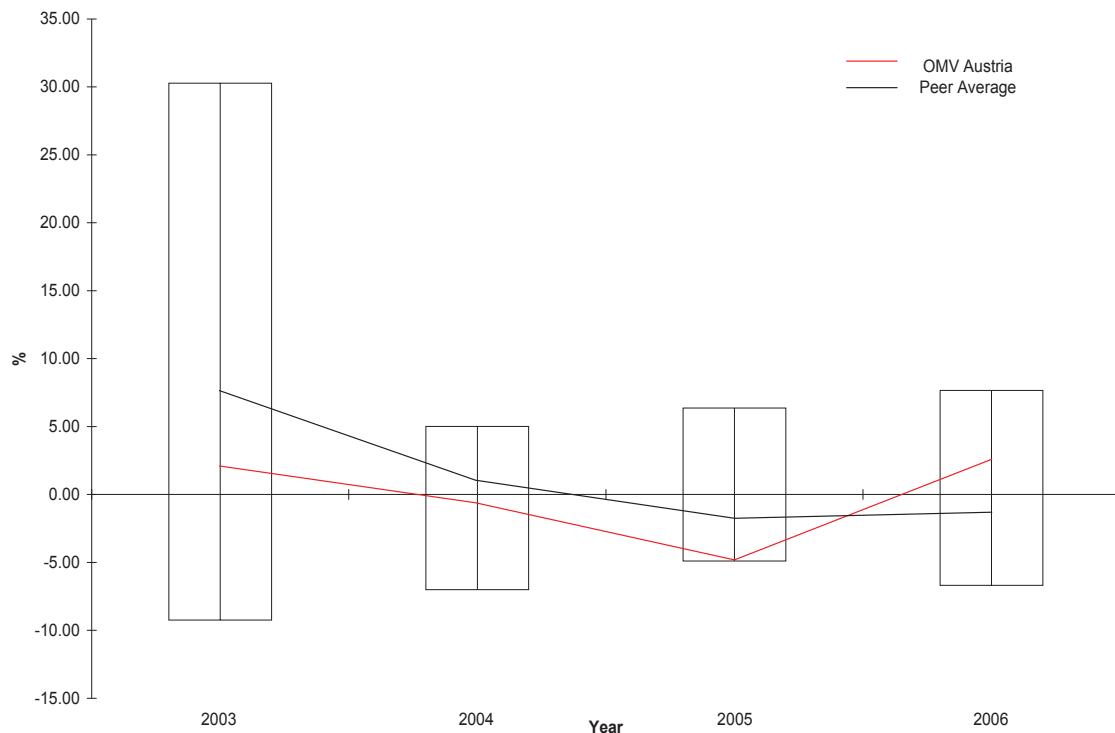


Fig. 33: Change of the CEE Peer's total annual Oil and Gas Production

Total proven oil and gas reserves

The proven oil and gas reserves are an absolute performance indicator too. Like for the annual oil and gas production is the meaningfulness for OMV Austria limited. Therefore, the absolute performance indicator was again turned into a relative one. The table below shows the ranking of the CEE peer group members between 2002 and 2006 (see Tab. 32).

Total Proved Oil & Gas Reserves, MMboe	2002	2003	2004	2005	2006
OMV Group*	1	1	1	2	2
OMV Group	1	1	1	1	1
Petrom	/	/	2	1	1
INA	3	3	4	4	4
MOL	2	2	3	3	3
OMV Austria	4	4	5	5	5

OMV Group* is without the impact of Petrom

Tab. 32: CEE Peer Members ranked to their annual Amount of Reserves

The first column shows the ranking of the OMV Group, if Petrom is not included. It shows that in the years 2005 and 2006, the OMV Group would lose its leading position. But, since Petrom is an integrated part of the OMV Group, the OMV Group is able to remain on top of the CEE peer group.

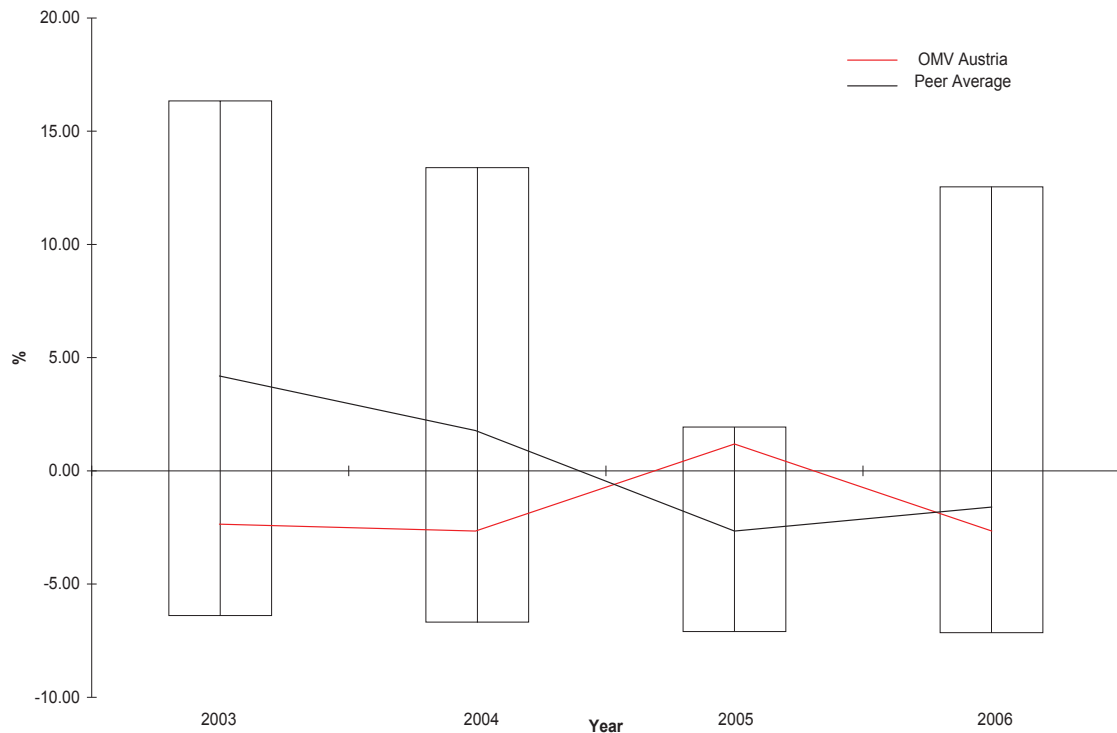


Fig. 34: Change of the CEE Peer's total proven Oil and Gas Reserves

The graph above shows the minimum and maximum range of the peer group members' changes of the proven oil and gas reserves. The black line represents the average trend of the reserves and the red line shows the behaviour of the OMV Austria. Until 2005, the average trend of the reserves declined.

The company with the highest increase in percent was MOL with an increase of more than 13 percent in 2003 and nearly 13 percent in 2006. The OMV Austria had almost a continuous decline of two percent of reserves per year (see Fig. 34).

Reserves to Production Relationship

The reserve versus production relationship is a relative performance indicator. This indicator, expressed in years, shows the expected years of production under the actual annual production rate and the amount of the annual reserves.

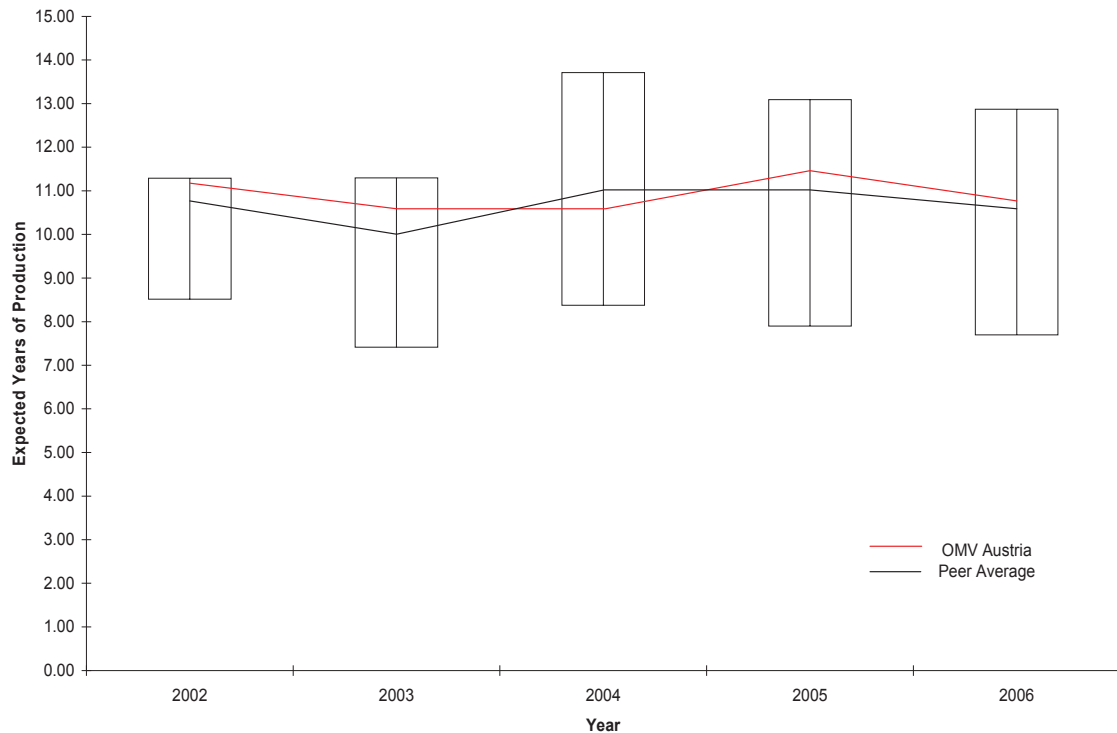


Fig. 35: Development of the Reserves to Production Rate expressed in Years

The graph above shows the minimum and maximum range of the expected years of production per year. The black line shows the average CEE peer group development. The red line shows the behaviour of OMV Austria. The range for the expected years of production lies between eight, and nearly 14 years of production (see Fig. 35). The average trend lies between ten and eleven years. Except of 2006 the OMV Austria was able to stay above the average trend (see Fig. 36). The reserve production relationship of INA showed the best performance throughout the years. This was possible because of their low annual production rates.

Capital Expenditures

The CAPEX is an absolute performance indicator. The table below shows the development of the ranking of the CEE peer members between 2002 and 2006. The significance for OMV Austria is limited, and so the CAPEX was turned into a relative performance indicator expressed as percentage. With the help of the relative performance indicator CAPEX/boe the development of the investments per boe per year is shown (see Fig 36).

CAPEX, \$MM	2002	2003	2004	2005	2006
OMV Group*	1	2	1	1	1
INA	3	3	3	4	4
MOL	2	1	2	2	3
Petrom	4	4	4	3	2
OMV Austria	5	5	5	5	5
OMV Group	1	2	1	1	1
INA	3	3	3	4	4
MOL	2	1	2	2	3
Petrom	4	4	4	3	2
OMV Austria	5	5	5	5	5

Tab. 33: Ranking of the CEE Peer Members CAPEX

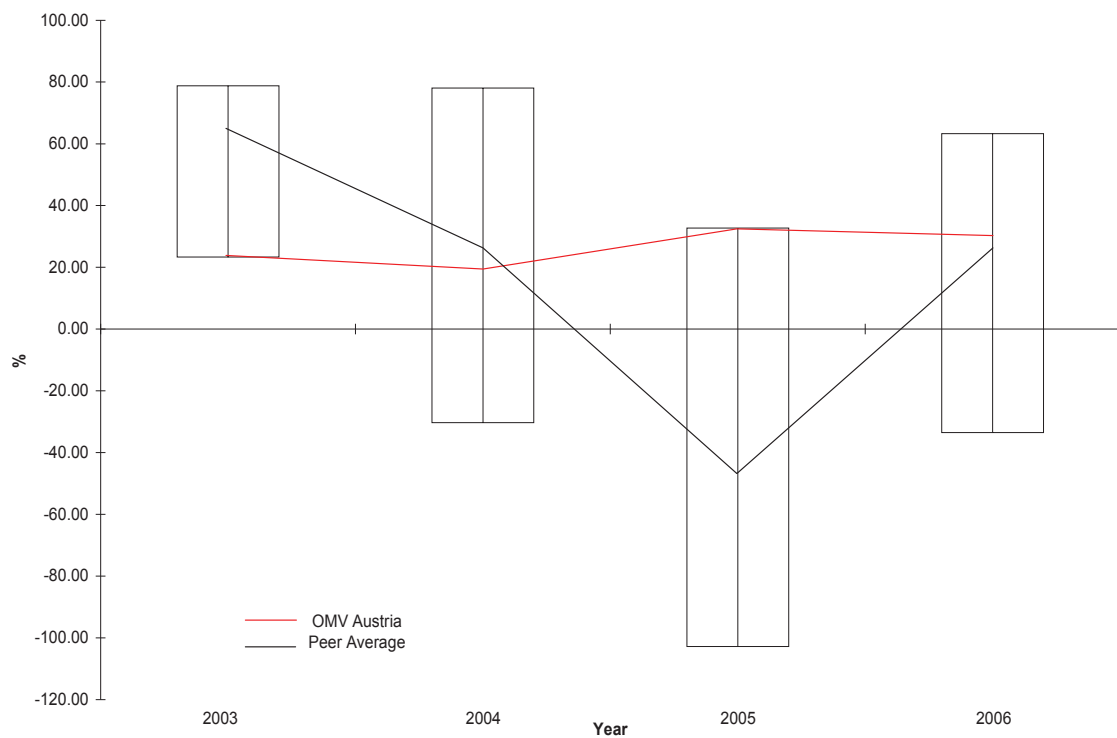


Fig. 36: Trend of the CEE Peer Members CAPEX

The figure above shows the minima and maxima of the capital expenditure of the CEE peer members. The percentages give information about the increase or decrease of investments related to the previous year. The black line shows the average trend of the CAPEX and the red line shows the development of investments of OMV Austria (see Fig. 36). During the years, the trend of OMV Austria's investments was nearly constant. The investments rose nearly for 20 percent per year.

The average trend results of the high investments taken in 2003 and the lower expenditures in the following years. The company with the highest CAPEX was the OMV (see Tab. 14). Most of the companies had an increasing CAPEX in the last years. Most of the invested capital of every company went into growth or modernization projects. The trend shows that every company that has a high EBIT started to invest their money (see Fig. 17).

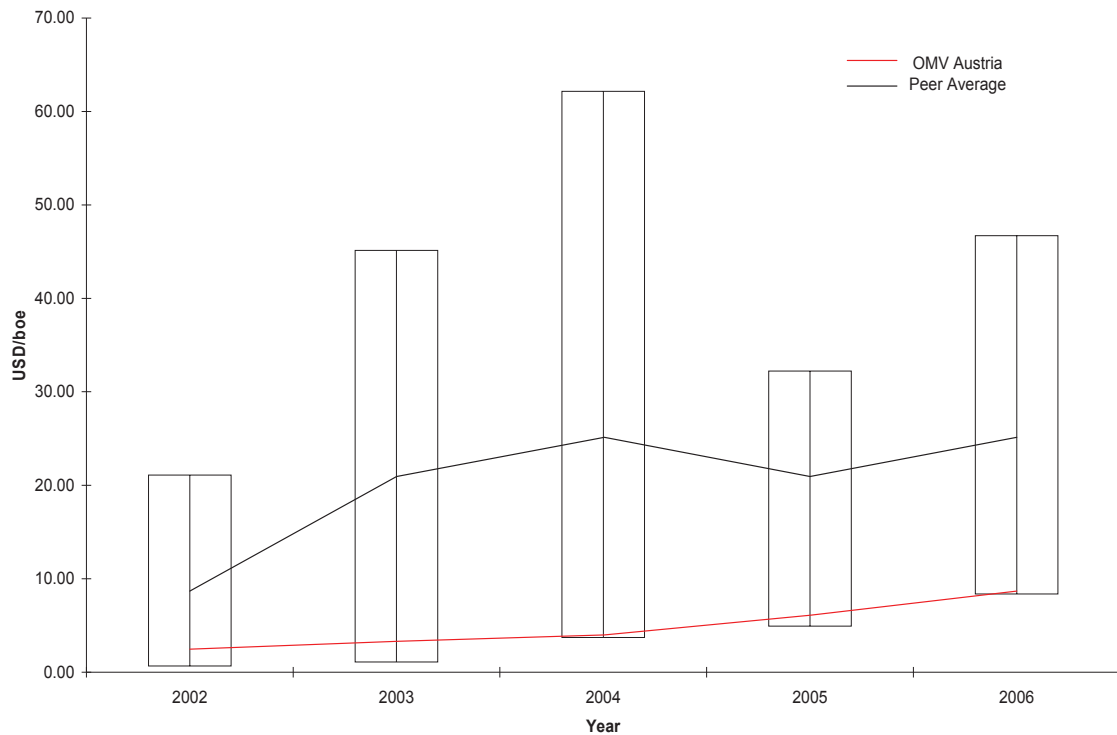


Fig. 37: Development of the CEE Peer's CAPEX divided by the annual Production

Tab. 33 shows that OMV is the leading company in investments. Resulting of this leadership the CAPEX per boe is also one of the highest in the CEE peer group.

The figure shows that OMV Austria is located at the minima of the CAPEX/boe. This means that lower investment costs respectively expenditures were necessary for the production of a boe of oil or gas.

The high CAPEX and CAPEX per boe may be interpreted as disadvantage compared to the other CEE Peer members, but a look at the other performance indicators shows that these strategy shows success – higher reserves, higher production rates, higher possibilities for growth.

Return on average Capital Employed

The Return on average capital employed is a relative key performance indicator that shows the profitability of a company – the higher it is the better the company performs.

The ROACE of MOL is by far the most profitable company in the CEE Peer group (see Tab. 16). The key for this achievement is a strong operating performance.

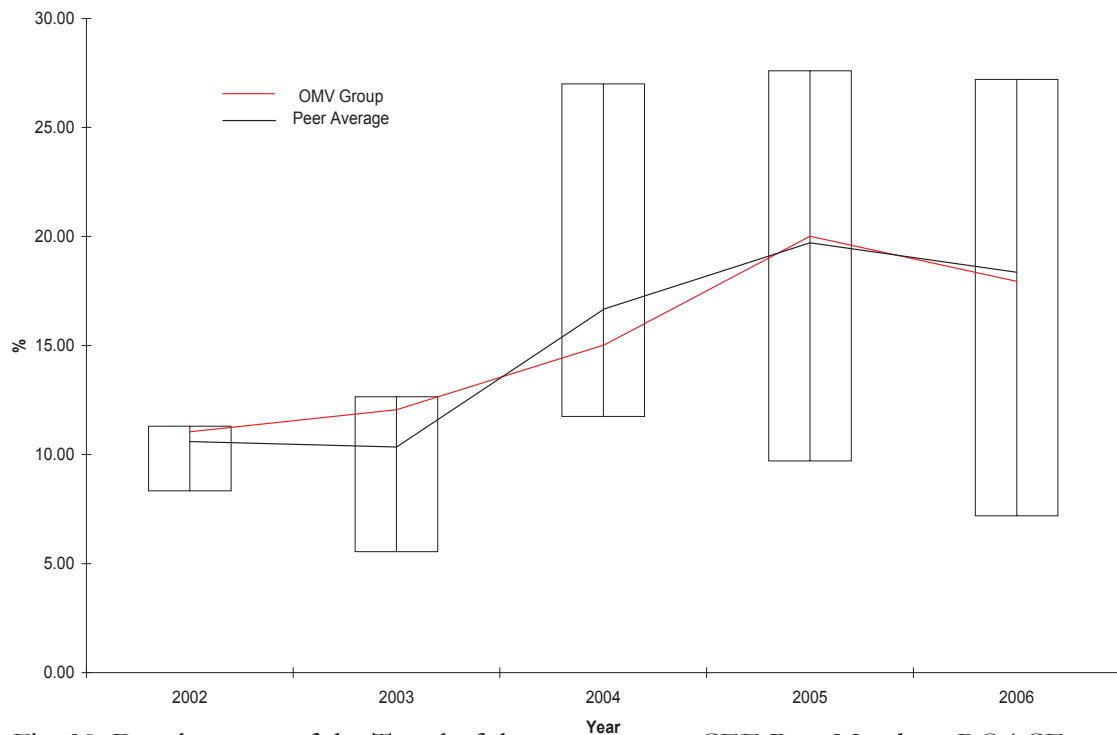


Fig. 38: Development of the Trend of the CEE Peer Members ROACE

The figure above shows the minima and maxima ranges of the CEE peer members ROACE. The black line represents the average trend of the peer group, whereas the red line shows the development of the OMV Group's ROACE. Unfortunately, no data for OMV Austria was available because for subsidiaries no detailed calculation is done.

In 2002 the all peer member had a nearly equal ROACE. This changed significantly in 2004 (see Fig. 38). The Hungarian MOL was the most profitable company throughout the years whereas the OMV Group developed equal to the peer's average. The company with the lowest ROACE during the years was the Croatian INA.

Finding Costs

Also, the finding costs are a relative performance indicator. Therefore, it is possible to make a direct comparison between the integrated companies and the subsidiary OMV Austria.

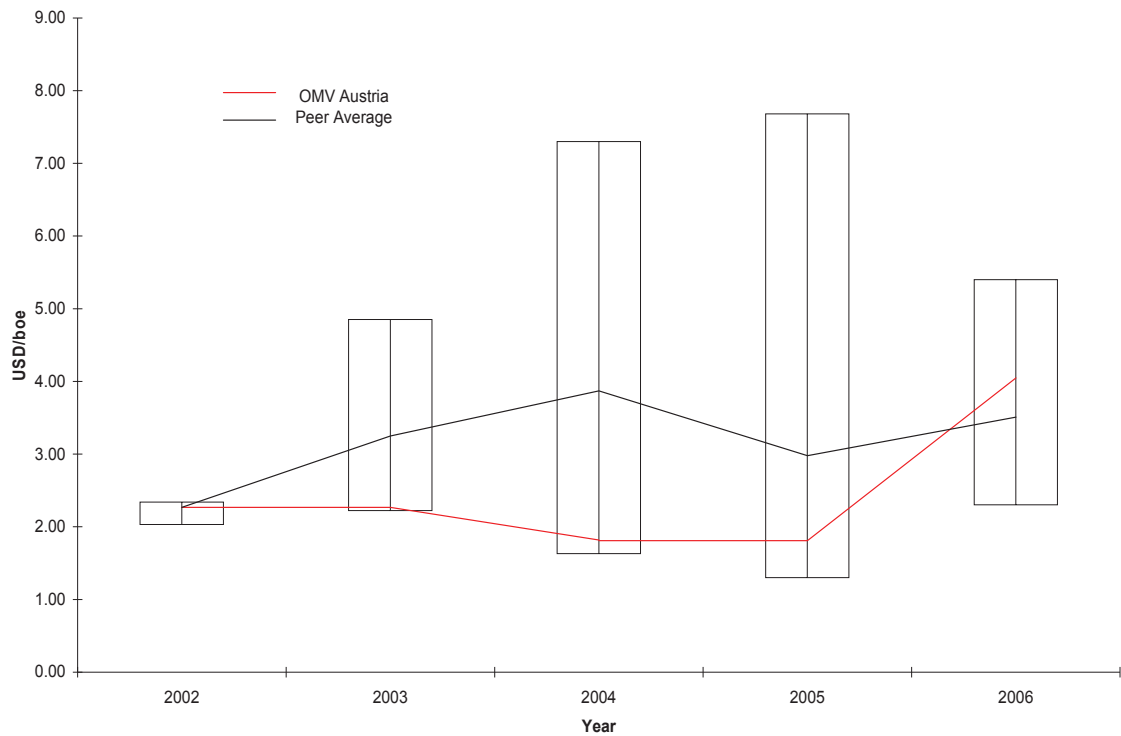


Fig. 39: Development of CEE Peer Members Finding Costs

The development of the minima and maxima finding costs is shown in Fig. 39. The black line represents the average trend of the peer group, and the red line shows the development of OMV Austria's finding costs. The development of the finding costs nearly follows the development of the crude oil price (see Fig. 19).

Until 2006, OMV Austria was able to hold nearly the lowest finding costs of the entire peer group. Continuously the lowest finding costs of the entire peer group had the OMV Group, although they had also the highest capital expenditures.

Production Costs

The production costs are a relative performance indicator, and so it is possible to make a direct comparison between OMV Austria and the other CEE peer members.

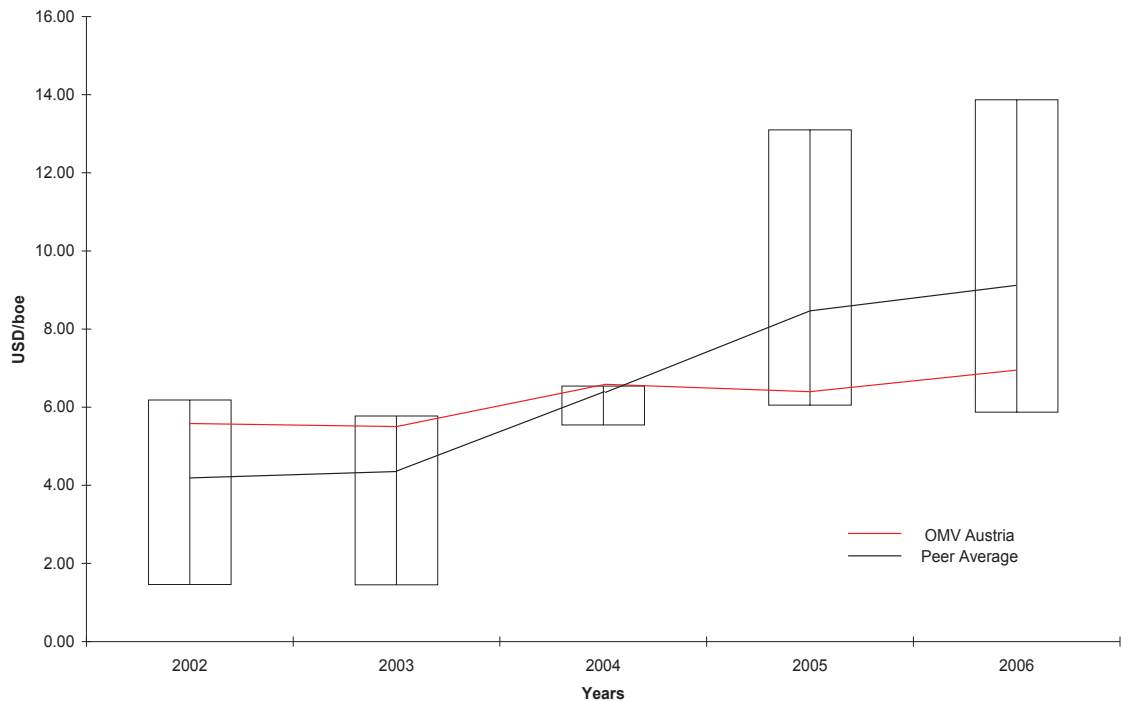


Fig. 40: Development of the CCE Peer Group's Production Costs

Fig. 40 shows graphically the lowest and highest production costs per year. The black line symbolise the average trend of production costs in the CEE peer group. The red line is the development of the production costs of the OMV Austria compared to the developments in the CEE Peer Group. It is significant to see that the production costs rose between 2002 and 2006.

Since 2004, MOL has compared to its Peers the lowest production costs. Like the other companies, they had to face the increase of costs in this field, but they were able to decrease their costs by changing their inventory logistics and finished inventory goods (see chapter 3.2.9). The OMV Austria was until 2004 above the average trend of production costs. But between 2004 and 2005 they were able to lower respectively hold their costs related to the increase of the other competitors and so they fell below the average (see Fig. 40).

4.2 Benchmarking with the Exploration and Production Peer Group

This chapter is dedicated to the benchmarking of the OMV Austria with its competitors within the, by the OMV defined E&P Peer Group. In chapter 3.4, the single E&P companies were analysed as preparation for the benchmarking-process.

Earnings before Interest and Taxes

The EBIT is an absolute performance indicator. It is influenced by the annual production, the average crude oil price, and the refining margins. Nevertheless, the impact of the downstream is only marginal.

Tab. 19 shows the E&P peer group's EBIT between 2002 and 2006 and Tab. 34 shows the development of the companies ranking.

EBIT, \$MM	2002	2003	2004	2005	2006
OMV Group	8	9	9	9	8
Anadarko	2	3	3	6	4
Apache	6	5	4	5	6
BG Group	2	4	2	3	3
Burlington	7	7	6	4	/
Hess	9	8	8	8	5
Marathon	5	6	7	2	1
Occidental	1	1	1	1	2
Petro Canada	4	2	5	7	7
OMV Austria	10	10	10	10	9

Tab. 34: Ranking of the E&P Companies EBIT

Throughout the years Occidental was the leading company with the highest EBIT in almost every year. But the most successful company related to the EBIT was Marathon Oil, which had an EBIT in 2006 nearly 8-times higher than in 2002 (see Tab. 19).

To gain a possibility to compare the OMV Austria with the E&P peer members it was necessary to change the absolute value of the EBIT into a relative one. This was done by changing the absolute value into a percentage. This percentage shows the change of the EBIT by year (see Fig. 41).

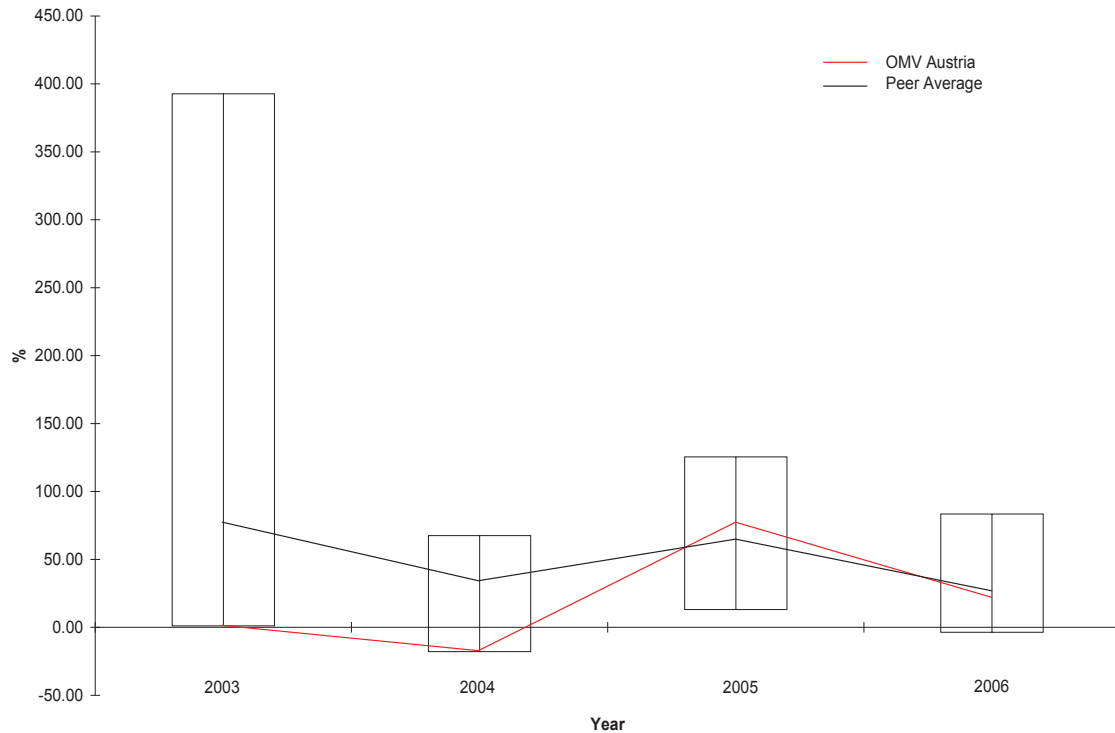


Fig. 41: Trend of the E&P Peer Group Members EBIT between 2002 and 2006

The figure above shows the minima and maxima EBIT per year of the E&P peer group members. The black line shows the average trend and the red line represents the trend development of OMV Austria. The average trend shows that the proportional growth of EBIT decreased (see Fig. 41), but in absolute numbers the EBIT of every company increased between 2002 and 2006 (see Tab. 19).

The company with the highest increase in its percentages was Hess with an average increase of its EBIT by more than 100 percent each year. The OMV Austria had an average increase of its EBIT by approximately 20 percent each year.

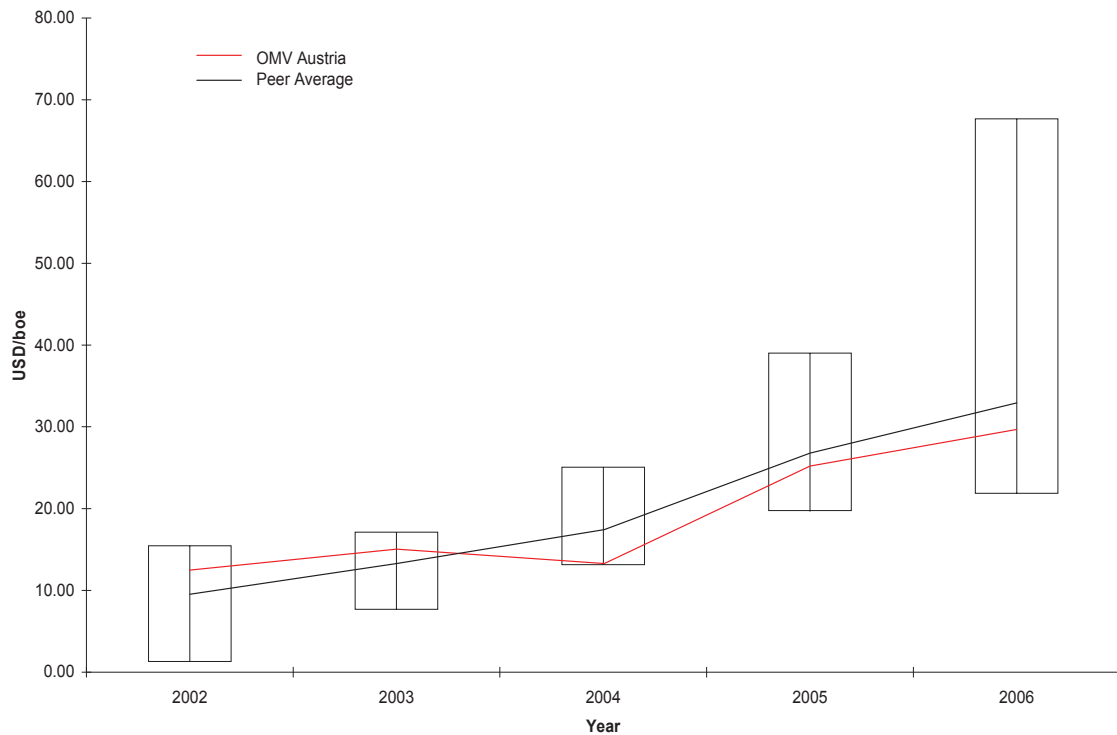


Fig. 42: Development of the E&P Peer Group's EBIT per boe

The figure above shows the trend of the E&P peer groups EBIT/boe. The black line represents the development of the average EBIT/boe and the red line shows OMV Austria's trend.

A look at Marathon's EBIT per boe underlines the statement of above, that Marathon's EBIT increased significantly. The EBIT per boe produced increased from 8.84 USD in 2002 to 67.75 USD in 2006, which means an increase for more than 760 percent in only five years. In the same time, the EBIT per boe produced of the OMV Austria increased "only" for 240 percent (see Fig. 42).

Total annual oil and gas production

The total annual oil and gas production is an absolute performance indicator. The meaningfulness of this indicator for the OMV Austria is limited, because of the fact that the OMV Austria is only a subsidiary (see Tab 21). To get a better overview of this indicator the annual change of the production in percent is chosen to make statements about the development and trend of the OMV Austria related to the E&P peer members (see Fig. 43).

Total Oil & Gas Production, MMboe/yr	2002	2003	2004	2005	2006
OMV Group	9	9	9	8	7
Anadarko	1	2	2	5	3
Apache	7	5	5	4	4
BG Group	6	4	4	2	1
Burlington	4	3	3	3	/
Hess	3	7	6	7	6
Marathon	5	6	8	6	5
Occidental	2	1	1	1	2
Petro Canada	8	8	7	9	8
OMV Austria	10	10	10	10	9

Tab. 35: Ranking of the annual Oil and Gas Production of the E&P Peer Members

The ranking above shows Occidental leading position within the peer group. Occidental was able to increase its production from 188.17 Mmboe per year to 219.00 Mmboe per year while the annual production of the OMV Austria nearly stayed stable.

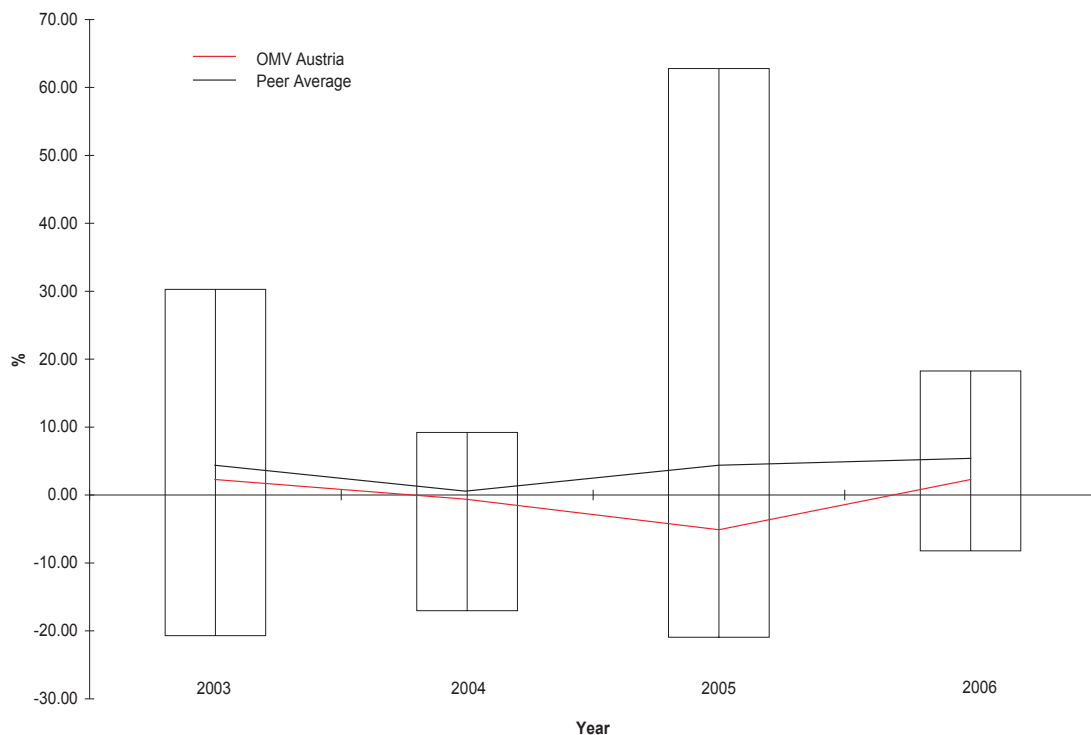


Fig. 43: Change of the E&P Peer Group's total annual Oil and Gas Production

The graph above shows the minima and maxima change in percent of the annual oil and gas production. The black line represents the average change of production and the red line shows the behaviour of the OMV Austria within the E&P peer group.

The annual production, which is a typical performance indicator in the oil business, of the British BG Group showed between 2002 and 2006 the best performance. The BG Group

was able to increase its output from 136.07 Mmboe per year to 219.37 Mmboe per year. That means an increase of nearly 161 percent. This performance was enabled by concentrating on their core business, the production of natural gas, and high investments in Egypt and Kazakhstan that paid off and lead to higher production rates.

Outstanding is the increase of the annual production of the OMV Group. Their output increased from 30.40 Mmboe per year to 118.40 Mmboe per year (see Tab. 21). This was only possible by the acquisition of the Romanian Petrom, which delivers more than 60 percent of OMV's annual production.

OMV Austria's production nearly stayed the same. Since the OMV Austria is a subsidiary of the OMV Group, other possibilities than the acquisition of other competitors have to bring positive results. The problem is the maturity of the Austrian fields and so high investments are necessary to stable production. Nevertheless, OMV Austria is very successful with its investments in drilling campaigns and the implementation of EOR methods (see chapter 3.3.3).

The average trend of the E&P peer group shows that the annual production of crude oil and natural gas increased continuously between 2002 and 2006 (see Fig. 43).

Total proven oil and gas reserves

The proven oil and gas reserves are an absolute performance indicator too. Like for the annual oil and gas production is the meaningfulness for OMV Austria limited. Therefore, the absolute performance indicator was again turned into a relative one. The table below shows the ranking of the CEE peer group members between 2002 and 2006 (see Tab.36).

Total Proved Oil & Gas Reserves, MMboe	2002	2003	2004	2005	2006
OMV Group	9	9	9	6	5
Anadarko	1	1	2	2	1
Apache	5	5	5	4	3
BG Group	3	3	3	3	4
Burlington	4	4	4	5	/
Hess	8	8	8	9	8
Marathon	7	7	7	7	7
Occidental	2	2	1	1	2
Petro Canada	6	6	6	8	6
OMV Austria	10	10	10	10	9

Tab. 36: Ranking of the E&P Peer Members total Oil and Gas Reserves

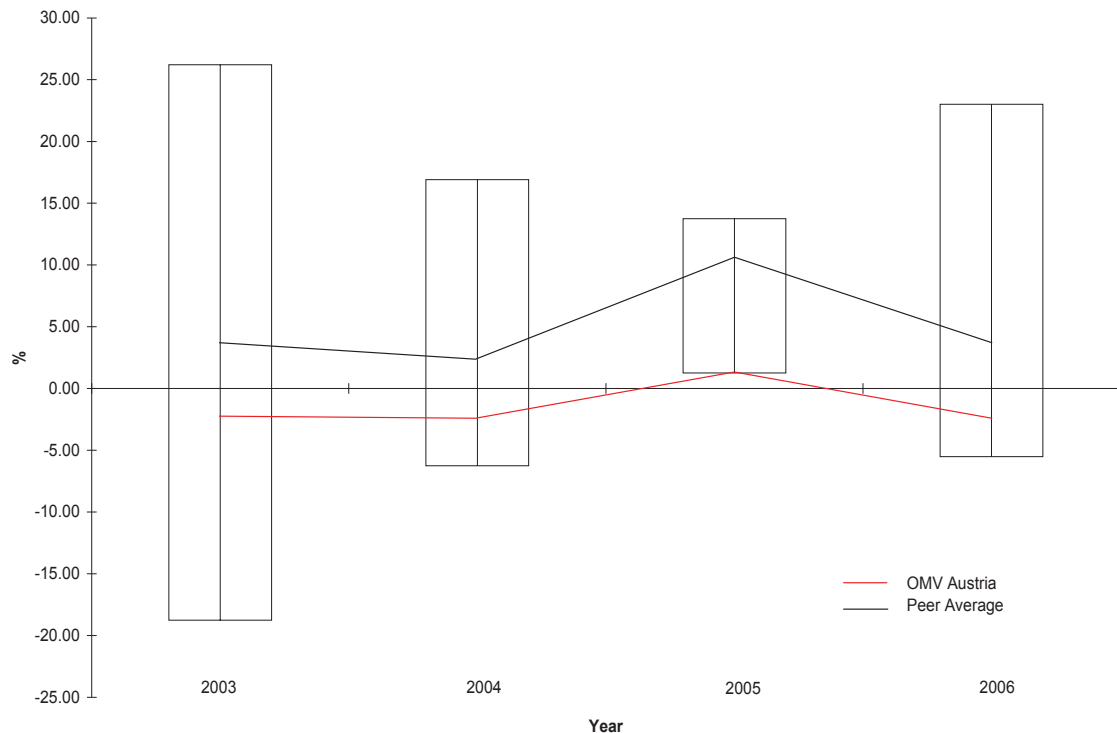


Fig. 44: Change of the E&P Peer's total proven Oil and Gas Reserves

Nearly every company was able to increase or stable their amount of reserves. A leading position within the peer group has the American Anadarko Petroleum Corporation. The reasons for the continuous increase of their reserves were high reserve replacement rates, a successful exploration and development program and the acquisition of the Kerr-McGee Corporation and the Western Gas Resources, Inc.

The analysis of the companies showed a trend to acquisitions to increase their own proven reserves. So they companies avoid high investments in risky exploration programs.

The graph above shows the comparison of the OMV Austria with the OMV Group, the average amount of reserves of the peer group per year and the top performing company Anadarko (see Fig. 37). It also shows that the average proven reserves of the E&P peer group continuously increase. The acquisition programs of the members give this particular circumstance.

Reserves versus production

The reserve versus production relationship is a relative performance indicator. This indicator, expressed in years, shows the expected years of production under the actual annual production rate and the amount of the annual reserves.

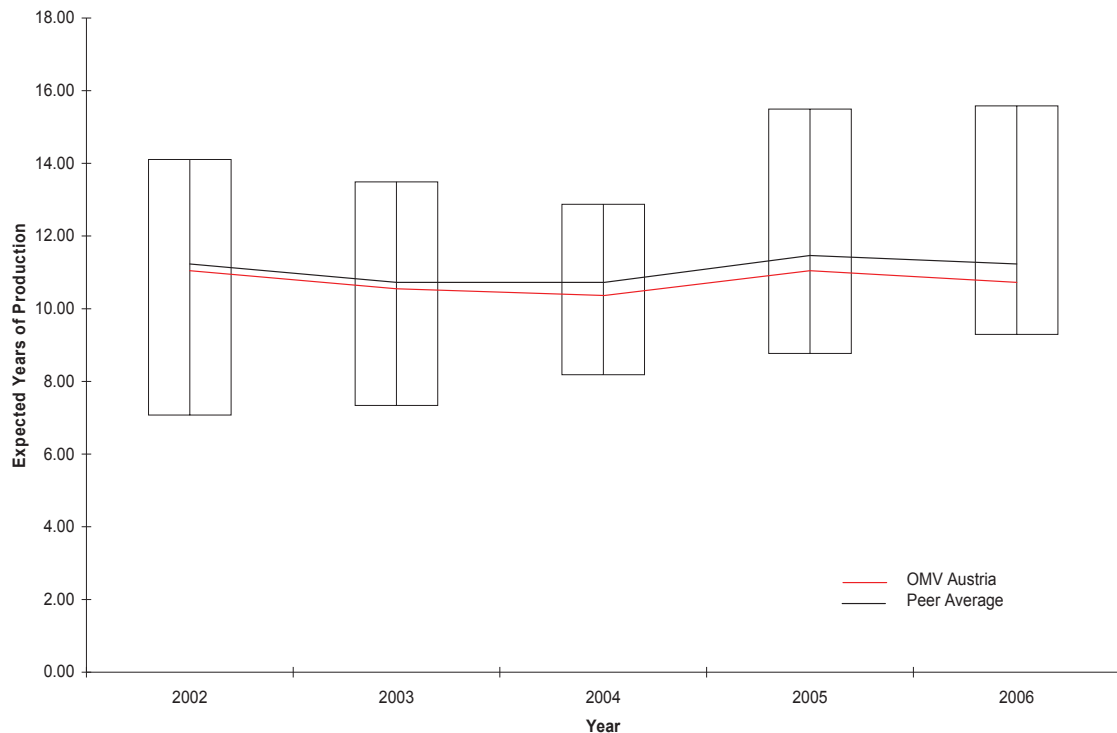


Fig. 45: Development of the E&P Peer's annual Reserves to Production Rate

According to Fig. 23, Anadarko is the company with the largest reserves to produce. In the average, every company of the E&P peer group is able to produce 11 years under the current circumstances. Anadarko owes its top performance to the fact of its high resources of reserves.

Related to the average the OMV Austria is in a quite good position without being top performer. The reasons of being top performer are found in the amount of reserves (see 3.3.4 and the analysis above). According to experiences during the analysis, companies that are not able to increase their proven reserves with the help of exploration activities or acquisitions will not be able to stay in the competition.

Capital expenditures

The CAPEX is an absolute performance indicator. The table below shows the development of the ranking of the CEE peer members between 2002 and 2006 (see Tab. 37). The significance for OMV Austria is limited, and so the CAPEX was turned into a relative performance indicator expressed as percentage. With the help of the relative performance indicator CAPEX/boe the development of the investments per boe per year is shown (see Fig. 46).

CAPEX, \$MM	2002	2003	2004	2005	2006
OMV Group	9	6	2	9	7
Anadarko	1	2	4	3	2
Apache	7	1	1	1	1
BG Group	4	9	5	6	6
Burlington	3	5	7	5	/
Hess	6	8	9	7	3
Marathon	5	4	6	4	4
Occidental	8	7	8	8	8
Petro Canada	2	3	3	2	5
OMV Austria	10	10	10	10	9

Tab. 37: Ranking of the E&P Peer Members CAPEX

The ranking above shows that Apache has the leading position, which means that their annual investments were the highest in the peer group (see Tab. 37). The company increased their CAPEX between 2002 and 2006 for more than 500 percent (see Tab. 24).

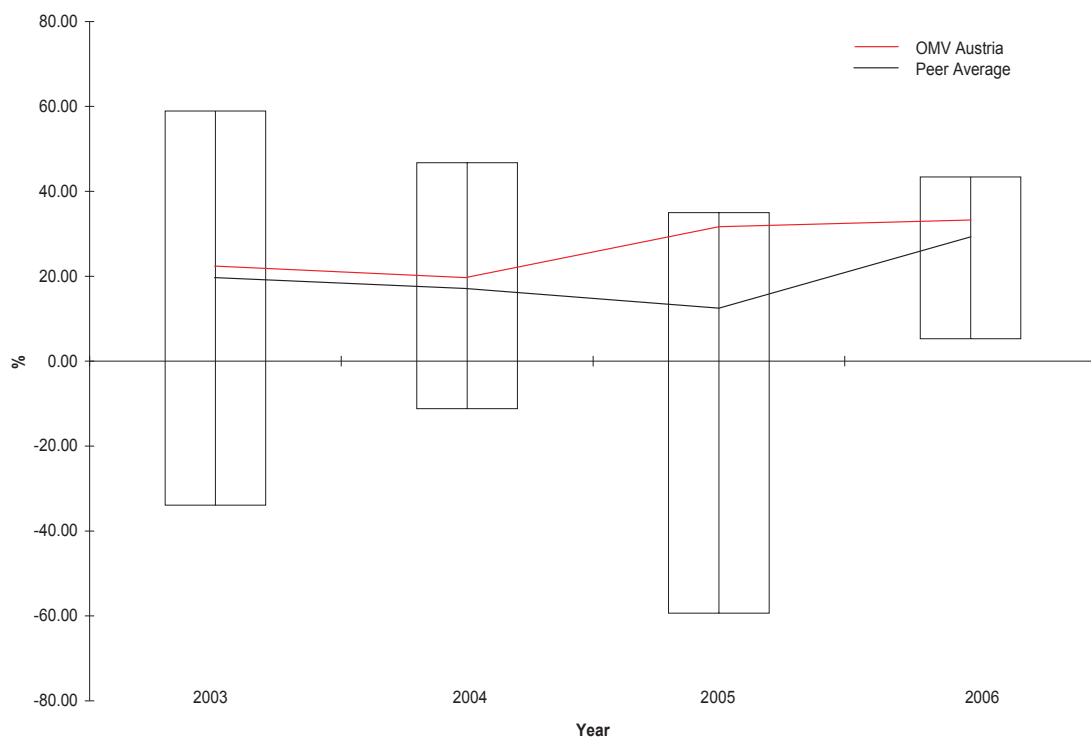


Fig. 46: Trend of the E&P Peer Group's CAPEX

All companies of the E&P peer group had increasing CAPEX (see Tab. 24). The main drivers were acquisitions, modernisations, and international exploration activities. The figure above was introduced to enable a comparison between the subsidiary OMV Austria and the other peer members. Between 2002 and 2006, OMV Austria's CAPEX nearly doubled but within the ranking but this do not have any statement. The figure above shows the minima and maxima percentage development of the E&P peer group members. The

black line shows the average trend and the red line shows the behaviour of OMV Austria. In the average increased Apache's CAPEX for 30 percent related to the year before. In second position are the growths of investments of OMV Austria with nearly 27 percent per year.

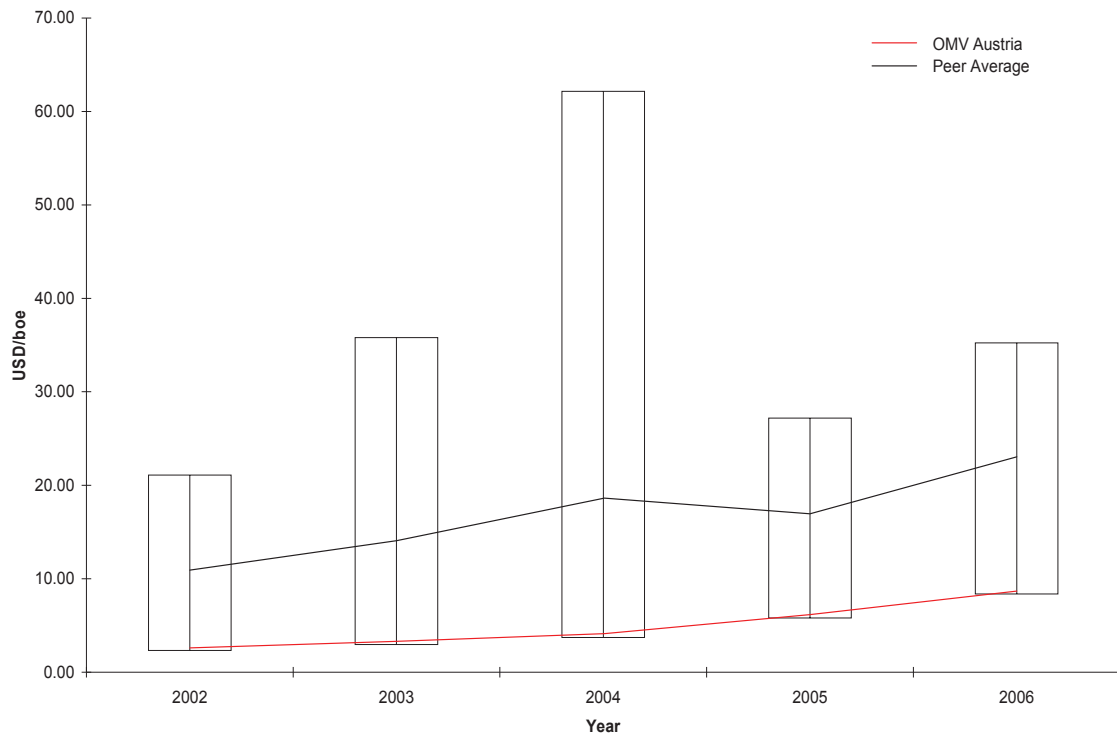


Fig. 47: Development of the E&P Peer's CAPEX divided by the annual Production

The figure above shows the minima and maxima ranges within the E&P peer members. The black line shows the average investments taken per boe. The trend shows a continuous increase, which means that higher investments per produced boe are necessary. The red line shows the development of OMV Austria.

A look at the CAPEX per boe shows that the OMV Austria was the most effective company related to its expenditures. The investments per produced boe are the lowest of the whole peer group and are very competitive.

ROACE

The Return on average capital employed is a relative key performance indicator that shows the profitability of a company – the higher it is the better the company performs.

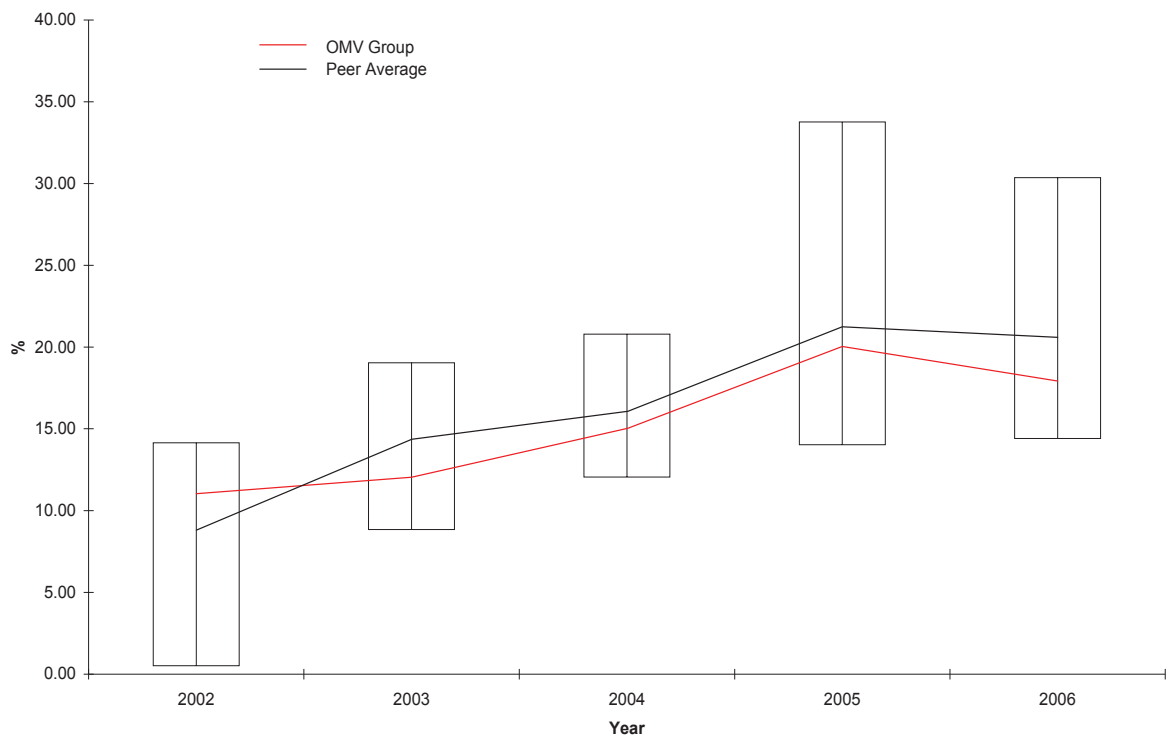


Fig. 48: Development of the Trend of the CEE Peer Members ROACE

Between the year 2002 and 2006, the most profitable company in the E&P peer group was Occidental Oil with an average ROACE of nearly 21 percent. The figure shows a comparison of the OMV Group's ROACE with the top performing members of its E&P peer group and the average ROACE. The figure shows that the OMV Group was every year below the average ROACE (see Fig. 48) and that the Occidental Petroleum Corporation was the most profitable company in the average. Marathon had also a top performance especially in the years 2005 and 2006. With the example of Occidentals 2006 ROACE, the impact of divestments on the ROACE comes clear (see Tab. 26).

Finding Costs

The finding costs are also relative performance indicator. As already mentioned, a relative performance indicator allows a comparison between integrated companies and subsidiaries.

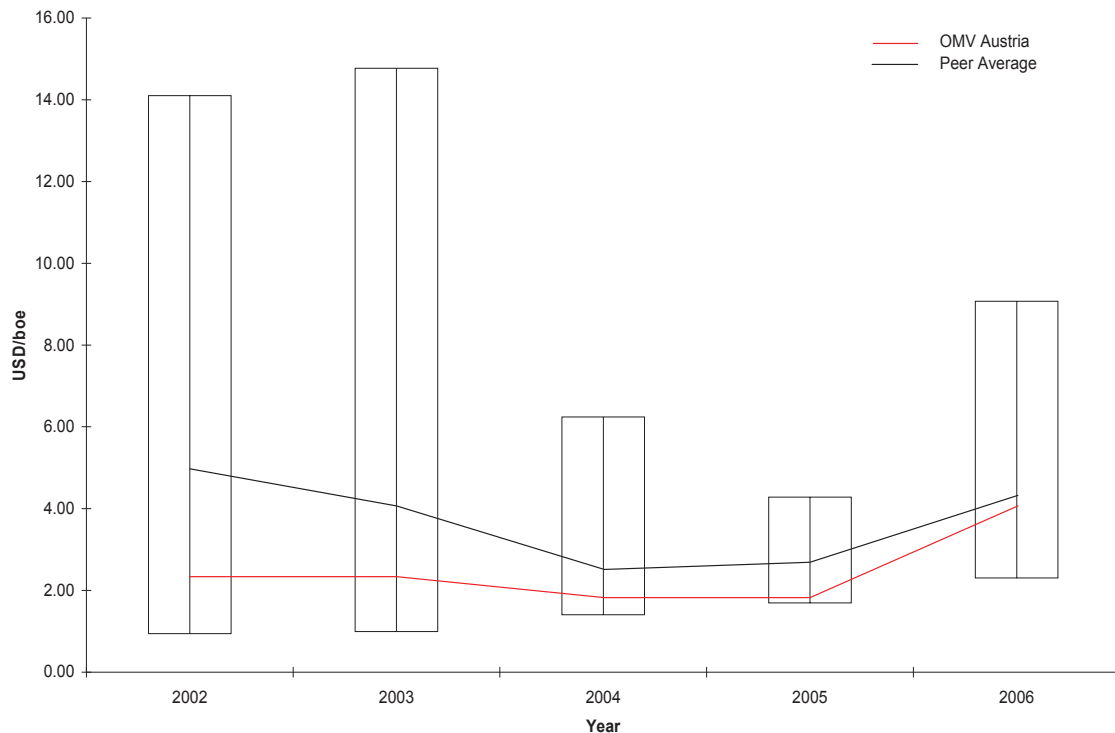


Fig. 49: Development of E&P Peer Members Finding Costs

The figure above shows that the range of the minima and maxima finding costs decreased until 2005 (see Fig. 49). The black line represents the average development of the finding costs within the peer group. The red line shows OMV Austria's development and it is possible to see that OMV Austria was always below the average. The target of every E&P Company is to hold its finding costs as low as possible to reach a better return on investment. The OMV Group and OMV Austria have a leading position in this issue although they had high investments for the growth strategy. Except of the Canadian Petro-Canada and the American Apache, none of the competitors was able to hold their costs at such a low level (see Tab. 27). One important reason of the low and competitive finding costs of Apache is that the regional finding costs in Egypt are at a very low level.

Production costs

The production costs are a relative performance indicator, and so it is possible to make a direct comparison between OMV Austria and the other CEE peer members.

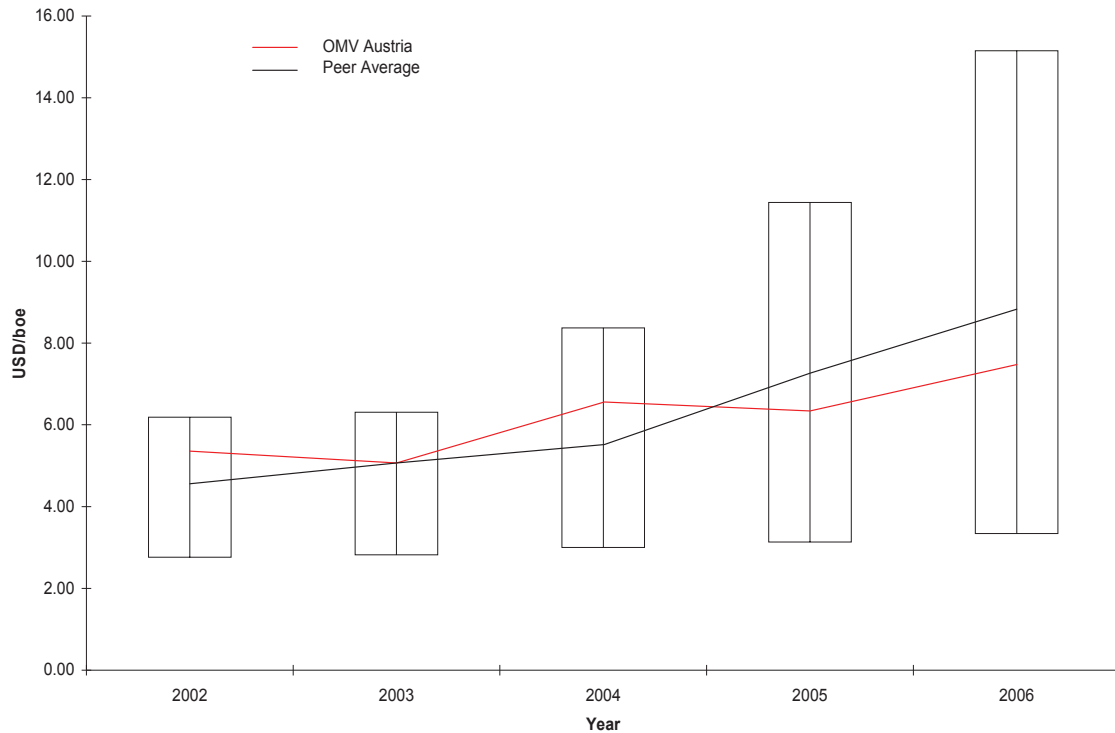


Fig. 50: Trend of the E&P Peer Group's Production Costs

The figure shows that the range of the minima and maxima production costs increased in the past years. The black line that represents the average trend shows a continuous increase of the E&P peer's production costs. The red line describes OMV Austria's development. The 'production costs' is an indicator, which can be influenced by the company. If the costs are low, the company has a good cost control system. All companies face the same problem – an increase of the production costs. The reasons are listed in chapter 3.4.9. The development is represented in Tab. 28. The BG Group has the “best” performance, this means their production costs are the lowest, has the Petro-Canada the “worst” or highest production costs of the Peer group.

5 Discussion of the Results

This chapter deals with the interpretation and discussion of the results of the analysis and of the benchmarking-process. The chapters three and four were dedicated to step two of the benchmarking process as described in chapter 2.2.2. The following brings a further interpretation and a possible future view.

5.1 Discussion of the CEE Peer Group Members

Trend 2002-2006	OMV Group	OMV Group*	Petrom	INA	MOL	OMV Austria
Change of EBIT, %	↑	?	↑	?	↑	↑
EBIT/boe, \$/boe	↑	↑	↑	↓	↑	↑
Change of Total Annual Oil and Gas Production, %	?	↔	↓	↓	↑	↓
Change of Total Oil and Gas Reserves, %	↓	↓	↓	↑	↑	↓
Reserves/Production, yr	↔	↓	↑	↓	↔	↔
Change of CAPEX, %	↑	↑	↑	↑	↓	↑
CAPEX/boe, \$/boe	↔	?	↑	↑	↓	↑
ROACE, %	↑	/	↑	↓	↑	/
Finding Costs, \$/boe	↔	/	↑	↔	?	↔
Production Costs, \$/boe	↑	/	/	↑	↑	↑

Positive Trend: ↑ Negative Trend: ↓ Stable Trend: ↔ No Interpretation possible: ? No Data available: /
OMV Group* without Petrom

Tab. 38: Trends of the CEE Peer Members Performance Indicators

The table above shows the trends of the different performance indicators throughout the years (see Tab. 38).

For some companies it was not possible to find a particular trend. These were marked with a question mark. The look at the analysis and the benchmarking part allowed no identification of a trend, because of the absence of additional data. The crossbeam signals the absence of any data at all.

The trend for the EBIT is for nearly every company positive. In absolute numbers, the EBIT increased (see Tab. 9) even if the average proportional increase of the EBIT decreased (see Fig. 31). The average increase was highest in 2004 and since then it declined.

The OMV Group without Petrom is question marked because between 2002 and 2005 the EBIT increased but 2006 it decreased. In this case, five years of data is not enough to make a correct assumption for a future trend (see Tab. 9). The same problem is given with the Croatian INA. The number of data records is too low to make a correct estimation.

Therefore, the EBIT of every company increased, the EBIT per boe does not follow this trend automatically. Except of INA every company faced an increasing EBIT per boe, which means that every company was able to make higher profits per produced boe (see Fig. 12 and Fig. 32). The interpretation of this trend is not easy. On one hand, it can be interpreted that higher production automatically results in a higher EBIT, but the impact of the high oil prices cannot be ignored. Even with low production rates, a high EBIT per boe can be reached if oil prices are high.

The trend of the annual production is declining for nearly every company (see Tab. 38 and Fig. 33). In the average, the annual production declines. The only company that was able to work against this trend was the Hungarian MOL, which had a continuous increase of its production (see Tab. 11 and Fig. 13). The OMV Austria has a negative trend too. Related to the year 2002 the production declined until 2006 (see Tab. 11) but at the percentage development of production, the OMV Austria follows a positive trend (see Fig. 33).

The amount of reserves is, in absolute numbers, more likely decreasing. In the average, the trend goes down (see Fig. 34). INA and MOL were able to withdraw this trend (see Tab. 12). The OMV Austria was not able to increase or even to hold its reserves. The maturity of the Austrian fields is mainly responsible for this trend.

In the average, the reserves versus production ratio stayed stable (see Fig. 35). But the behaviour of the companies is quite different. While companies like the OMV Group with the impact of Petrom, OMV Austria and MOL were able to hold their future years of production, the Croatian INA and the OMV Group without Petrom had a decline in their years. Only Petrom was able to increase its years of production. But this result is deceptive because of the decline in Petrom's production. The regard of the OMV Group shows that Petrom has a major impact in its behaviour of the future production (see Tab. 38).

The trend of the CAPEX increased for every company except for the Hungarian MOL. In common the statement, "if the earnings are high, the companies invest more" is not true, but a look at the analysis part shows, that the CEE peer members do many investments (see Tab. 14). The OMV Austria continuously increased their capital expenditures since 2002 (see Fig. 36). The CAPEX more than tripled from 2002 to 2006.

The CAPEX per boe nearly follows the trend of the increasing CAPEX, which is not necessarily astonishing. High investments that were necessary to stay competitive and therefore the investments to produce hydrocarbons increased. The reason for the negative trend of MOL's CAPEX per boe is that the high level from 2003 was successfully minimized (see Tab. 14).

The ROACE, which shows the profitability of a company, rose except for INA. Unfortunately, a comparison between the OMV Austria with its peers is not possible because the OMV does not calculate the ROACE for its subsidiaries. While the ROACE decreased in 2006 related to 2005 (see Tab. 16) was it higher than 2002. It means that every company faced their financial potential to become more profitable. Only INA did not follow this trend. The ROACE of 2006 was even lower than in 2002 (see Tab. 16).

In general, the finding costs are increased, but the development of the companies differs (see Fig. 39). While the finding costs stayed nearly stable for the OMV Group and OMV

Austria, the finding costs of INA and MOL do vary between 2002 and 2006. For the Hungarian MOL no particular trend was identifiable. The development of the finding costs nearly described a Gauss distribution curve (see Fig. 19).

Like the finding costs, also the production costs increased. Unfortunately, it was not possible to gain any data about Petrom. Every company has to face the same problem that their production costs increased. The reasons are manifold. They range from the maturity of the fields to expensive production because of offshore activities. The development of the production costs between 2002 and 2006 nearly followed the increasing crude oil prices (see Fig. 20).

2002 - 2006	OMV Group	MOL	INA	Petrom	OMV Austria
Change of EBIT, %		d e	c	b	
EBIT/boe, \$/boe	a b	c d e			
Change of Total Annual Oil and Gas Production, %	b c d			e	
Change of Total Oil and Gas Reserves, %	b d	c e			
Reserven/Production yr	a		b c d	e	
Change of CAPEX, %	c	b		e	d
CAPEX/boe, \$/boe				a b d	c e
ROACE, %		b c d e		a	
Finding Costs, \$/boe	c e	a		d	b
Production Costs, \$/boe		d e	a b c		

2002: a 2003: b 2004: c 2005: d 2006: e

Tab. 39: Top Performance of the CEE Peer Group

2002 - 2006	OMV Group*	MOL	INA	Petrom	OMV Austria
Change of EBIT, %		d e	c	b	
EBIT/boe, \$/boe	a b	c d e			
Change of Total Annual Oil and Gas Production, %	b c			d e	
Change of Total Oil and Gas Reserves, %	b	c e	d		
Reserven/Production yr	a		b c d	e	
Change of CAPEX, %	c	b		e	d
CAPEX/boe, \$/boe				a b d	c e
ROACE, %		b c d e		a	
Finding Costs, \$/boe	c e	a		d	b
Production Costs, \$/boe		d e	a b c		

2002: a 2003: b 2004: c 2005: d 2006: e

Tab. 40: Top Performance of the CEE Peer Group (OMV Group without Petrom)

The tables above show that performed best in which year (see Tab. 39 and Tab. 40). The different characters symbolise the different years. With the help of this matrix, it is possible to see which company do have dominance in which performance indicator. The differences between the performance of the OMV Group and the OMV Group without the impact of Petrom are not very big but in some areas significant, especially for the annual oil and gas production and the amount of the reserves. A comparison between the two matrixes shows the influence of Petrom's acquisition by the OMV Group (see Tab. 40)

5.2 Discussion of the E&P Peer Group Members

The trends of the performance indicators of the E&P peer group are shown at the following matrix (see Tab. 41).

The trends for the percentage growth of the EBIT and of the EBIT per boe are positive for all E&P peer members (see Tab. 41). The growth of the performance indicator follows nearly parallel the development of the crude oil prices (see Fig. 21 and Fig. 22). The main factor that influenced the behaviour of these performance indicators was the increasing crude oil price since 2003.

There is no uniform trend of the annual oil and gas production of the different companies. The trend for the OMV Group is marked with a question mark because until 2005 the production is increasing, especially because of the acquisition of Petrom, but since then declining (see Tab. 11). So it is difficult to define a certain trend. Anadarko, Hess, Petro-

Canada and OMV Austria do have a declining annual production. The reasons are found in chapter 3.4.3. Whereas the other companies were able to increase, their annual output and therefore they had a positive development (see Tab. 41). The drivers for this trend were acquisition of competitors, higher production of assets abroad, the re-entry to Libya and intensive drilling programs worldwide.

Half of the E&P peer members had to face a declining amount of their proven reserves (see Tab. 22 and Tab. 41). The negative development was caused by the maturity of fields, negative revisions, high production rates, and by the sales of assets. On the other hand was the positive development of companies like Anadarko, Burlington, Hess, Occidental and Petro-Canada caused by the development of new core areas, improved recovery, the acquisition of developed fields, and the acquisition of competitors. All these measures allowed the former named companies to increase their amount of proven reserves.

As seen in Tab. 41, none of the companies do have declining years of possible production. The reasons are found in the development of the annual production and the development of the proven reserves. While the OMV Group and OMV Austria were able to stable their years of production, companies like Anadarko, Apache, Hess, Marathon and Occidental were able to increase their expected years. Most of them were also these, that were able to increase their reserves.

Nearly all E&P peer companies have a increasing development of the CAPEX, and therefore of the CAPEX per boe, too (see Tab. 41). The increase of the CAPEX was primary given by the acquisitions of other companies or new fields (see Fig. 38). But the increasing capital expenditures had the negative effect of an increasing CAPEX per boe, which means that the investments for a produced barrel of oil equivalent also increased. For some companies the CAPEX per boe nearly exploded. Hess CAPEX per boe more than tripled between 2002 and 2006, while the British BG Group's CAPEX only had a smooth increase of their expenses per boe (see Tab. 25).

Except of the Canadian Petro-Canada, every company was able to improve their profitability (see Tab. 41 and Tab. 26). While the other companies are "typical" exploration and production companies, Petro-Canada invests much money in non-conventional hydrocarbon deposits, like tar sands. Even if the ROACE stayed nearly constant with 14 percent, the continuing increases of the crude oil price will possible lead to a high profitability.

The trend of the finding costs has a high variation within the E&P peer group. While companies like Apache, the BG Group and Occidental had to face increasing finding costs, companies like Anadarko, Burlington, Hess and Marathon were able to decrease their costs. Both, the OMV Group and the OMV Austria were able to stabilize their finding costs. Generally, the finding costs increases again since 2005 (see Fig. 49). The main reasons for the differentials between the companies are their areas of interest. Exploration costs abroad are lower than in the domestic fields in the United States or Great Britain respectively the search for hydrocarbons in offshore areas is more expensive.

Like the CEE peer group, the members of the E&P peer group has to face the problem of increasing production costs. The reasons are the maturity of domestic fields, higher costs for equipment, and an increasing exposure to the non-conventional resource opportunities. Another reason is that most of the E&P peer group companies are within the offshore business, where costs generally are higher than onshore.

The comparison of OMV Austria with the members of the E&P peer group with the help of a matrix is shown below (see Tab. 41). Like the matrix of the CEE peer members, the matrix of the E&P peer members shows the top performer per year. Unlike the CEE matrix, the E&P matrix shows an absolute dominance for some performance indicators. For the CAPEX per boe the OMV Austria shows an absolute dominance regarding to the low investments that are necessary for a produced boe. Regarding the production costs, no other company has such low values like the British BG Group (see Tab. 41).

5.3 Summarized Results of OMV Austria E&P GmbH

The results of the OMV Austria Exploration & Production GmbH have to be seen critical because of the limitation that the OMV Austria is only a subsidiary of the OMV Group. Although the OMV Austria is only a subsidiary, it was able to have a higher EBIT than INA in 2002 and 2006. The EBIT/boe shows a good performance in 2005 and 2006. Only MOL has higher values (see Tab. 10). The CAPEX increased with the same percentages like for the other companies. The relationship between the CAPEX and the annual production is the lowest of the entire CEE peer group in 2006. Only Petrom had lower values, caused by low investment activities until 2005. Related to the absolute numbers of the annual production and the amount of reserves, the OMV Austria is not able to compete with its peers. Unfortunately, in the average are the annual production and the reserves declining, even there is a percentage increase of production in 2006 (see Fig. 33). Unfortunately, no argument about the profitability of OMV Austria is possible because of the lack of data about the ROACE, which is not calculated by the OMV Group for its subsidiaries. Related to the other peer members the finding costs of OMV Austria were very competitive. They are among the lowest in the CEE peer group (see Fig. 39). The production costs are in the mid field of the peer group (see Fig. 40). The general view on the OMV Austria shows that it is a well performing company, which has the abilities of further improvement to increase its performance in the future.

2002-2006	OMV Group	Anadarko	Apache	BG Group	Burlington	Hess	Marathon	Occidental	Petro-Canada	OMV Austria
Change of EBIT, %	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
EBIT/boe, \$/boe	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Change of Total Annual Oil and Gas Production, %	?	↓	↑	↑	↑	↓	↑	↑	↓	↓
Change of Total Oil and Gas Reserves, %	↓	↑	↓	↓	↑	↑	↓	↑	↑	↓
Reserven vs Production, yr	↔	↑	↑	↔	↔	↑	↑	↑	↔	↔
Change of CAPEX, %	↑	↑	↑	↑	?	↑	↑	↑	↑	↑
CAPEX/boe, \$/boe	↔	↑	↑	↑	?	↑	↑	↑	↑	↑
ROACE, %	↑	↑	↑	↑	↑	↑	↑	↑	↔	/
Finding Costs, \$/boe	↔	↓	↑	↑	↓	↓	↓	↑	?	↔
Production Costs, \$/boe	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑

Positive Trend: ↑ Negative Trend: ↓ Stable Trend: ↔ No Interpretation possible: ? No Data available: /

Tab. 41: Trends of the E&P Peer Members Performance Indicators

2002-2006	OMV Group	Anadarko	Apache	BG Group	Burlington	Hess	Marathon	Occidental	Petro-Canada	OMV Austria
Change of EBIT, %						b c	d e			
EBIT/boe, \$/boe	a c						d e		b	
Change of Total Annual Oil and Gas Production, %	b d	e			c					
Change of Total Oil and Gas Reserves, %	d	e	b c							
Reserven vs Production, yr		d e			a b c					
Change of CAPEX, %	b e			c		d				
CAPEX/boe, \$/boe										a b c d e
ROACE, %							e	c d	a b	
Finding Costs, \$/boe	e			a b	d			c		
Production Costs, \$/boe				a b c d e						

2002: a 2003: b 2004: c 2005: d 2006: e

Tab. 42: Top Performance of the E&P Peer Group

5.4 Recommendations

This chapter finally tries to find the company with the best practice. Because of the limitation of information, the performance indicators were clustered in absolute monetary performance indicators (EBIT, CAPEX), relative monetary performance indicators (EBIT/boe, CAPEX/boe, ROACE, finding costs, production costs) and non-monetary performance indicators (annual oil and gas production, annual proven oil and gas reserves, reserves versus production ratio). Within these three groups, causalities are searched to find the best practice.

Within the CEE peer group Petrom showed the best practice regarding the absolute monetary performance. Indeed were the absolute numbers of the OMV Group* the highest within the group, but Petrom had in 2006 a twelve time higher EBIT than in 2002, and the 2006 CAPEX was more than nineteen times higher than in 2002 (see Tab. 9 and Tab. 14). The reasons for these extraordinary successes were the acquisition in 2004 through the OMV and the resulting modernization and restructuring measures like, centralizing organization and accounting structures, closing down of uneconomic filling stations and storage farms, launching of a franchise system for filling stations, personnel restructuring program, new agreement for major services with Petromservice and the acquisition of Rafiserv.⁴²⁵

In the clustered relative monetary performance indicator group, the Hungarian MOL showed, except of the finding costs, the best performance. It has since 2004, the highest EBIT per boe, the lowest increase of the CAPEX per boe, since 2003 the highest ROACE, and the production costs stayed nearly stable, while the production costs of the other peer members increased.

Therefore the Petrom has the highest annual oil and gas production, the highest amount of reserves and the highest reserves versus production ratio, the Hungarian MOL is the dominating company related to the non-monetary performance indicators. The reason is that the production and reserves continuously declined, while MOL was not only able to increase their reserves and their production, they also increased their expected years of production (reserves/production ratio) (see Tab. 11, Tab. 12 and Tab. 13). The measures, that lead to the best practice were a restructuring focus to lead a slow down of the natural decline in domestic production, field revisions, an increase of reserves in the Russian assets and acquisitions of existing fields.

Within the E&P peer group, regarding the absolute monetary performance indicators, the American Hess showed the best performance. Marathon Oil has the highest EBIT and Apache the highest CAPEX, but the Hess Corporation was able to increase its 2002 EBIT for over nineteen times until 2005 (see Tab. 19), while its CAPEX "only" increased for approximately 2,5 times. The high investments in the E&P sector and joint ventures helped the company to reach this high level of performance.

The identification of causalities for the relative monetary performance indicators to find the resulting company with the best practice was complicated. None of the companies showed best practice in all of the five performance indicators. If they had strengths in two or three indicators, they showed strong weaknesses in others. During the comparison of

⁴²⁵ see OMV, Annual Report Annual Report 2005, p. 30

their rankings, their average behaviour and the changes of the performance indicators between 2002 and 2006 the only company, which nearly always showed good results, was Marathon Oil. It is a leading company in the EBIT per boe relationship, the ROACE, the finding and the production costs. For example, Marathon Oil was able to decrease their finding costs between 2002 and 2006 (see Tab. 27).

The leading company of the E&P peer group, related to the non-monetary cluster is the Anadarko Petroleum Corporation. This company has the highest amount of reserves, the third highest annual production and the most years of production left (see Tab. 21, Tab. 22 and Tab. 23). But the highest growth in production and reserves had the OMV Group. They showed best practice by the acquisition of competitors, like Petrom, Preussag and Petro Ofisi, the acquisition of existing producing fields, and with the discovering of new fields in Libya and Austria.

CEE Peer Group	Benchmark	Reasons
Absolute monetary Performance Indicators	Petrom	<ul style="list-style-type: none"> - Acquisition through the OMV Group - Reorganisation of the Company - Restructuring Measures
Relative monetary Performance Indicators	MOL	<ul style="list-style-type: none"> - Improvement of Efficiency - Successful Integration of MOL Subsidiaries
Non-monetary Performance Indicators	MOL	<ul style="list-style-type: none"> - Restructuring Focus lead to a slow down of the natural Decline in domestic Production - Investments in Russia, Kazakhstan - Domestic Exploration - Field Revisions - Increase of Reserves in Russia - Acquisitions of existing Fields
E&P Peer Group		
EBIT	Hess	<ul style="list-style-type: none"> - Successful Investments in the E&P Sector - Joint Ventures
CAPEX	Apache	<ul style="list-style-type: none"> - Development Activities and Acquisitions - New Core Areas (UK Sea) - Additions to Property and Equipment - Exploration and Development Activities
Relative monetary Performance Indicators	Marathon	<ul style="list-style-type: none"> - Drilling of low-risk Wells - Strong Growth Positions in North and West Africa resulting in low Production and Finding Costs
Non-monetary Performance Indicators	OMV Group	<ul style="list-style-type: none"> - New Discoveries in Libya, Austria - Acquisition of Preussag, Petrom - Acquisition of producing Fields - Organic Growth

Tab. 43: Summary of the Best Performing Benchmarks

Finally, some recommendations and personal thoughts, that should help to improve subsequent studies, or thesis that have a similar task.

The survey for this thesis was not easy from the beginning. The problem was that nearly no information was available for most of the companies in CEE. There are various reasons for these circumstances. Many companies in Central Eastern Europe are still state-owned and so they do not public any reports or annual reports. If data and information is available of these companies, these reports are written in their mother-language or the information is unsuitable for use. There exists the European IFRS but the state-owned have their own standards of reporting and this makes a direct comparison complicated and very often impossible.

As discussed in chapter 3.3 only four companies had enough information for benchmarking, of 17 possible companies found. The most interesting detail was that the Austrian RAG does not have any annual report and therefore no public data or information about their performance indicators.

Another problem was that it was very complicated to get a complete overview for the indicators of the companies, for example, the Romanian Petrom, where it was not possible to find data especially before the year 2004.

The use of the internet database of John S. Herold and PFCEnergy is useful for the first screening of performance indicators. At Herold over thousand performance indicators are listed and can be used for any analysis needed, but a major disadvantage is that most of the data of the CEE companies is not complete, or up to date. These databases deliver only facts and no explanations for the reasons of the development of the indicators. This makes a benchmarking-study complicated.

A benchmarking-study with companies of CEE is a very interesting and challenging topic, and such a study will be more successful in the next years. But today, even more then ten years after the end of the communism in Eastern Europe, the E&P companies do not have implemented the reporting standards that are used in the rest of Europe. To gain enough and useful information it is more recommended to contact these companies directly after screening the public data that is available.

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