

CHALLENGES AND OPPORTUNITIES FOR THE SUPPLIERS OF TECHNOLOGIES, EQUIPMENT AND SERVICES FOR SEPARATION TOWERS

Urs Fankhauser
Sulzer Chemtech Ltd.

The increasing globalization of the industry and the shifting of capacities of the chemical processing industry to growing markets like China, Middle East and others, brings new challenges and opportunities to suppliers of technologies, equipment and services for separation towers.

Adapting to increasing customer demands, changing market conditions, as well as technological and environmental requirements, require higher flexibility and innovation ability of suppliers.

The increasing global energy demand, the prevailing high oil price, the increasing investment in non-conventional hydrocarbons such as heavy oil, oil sand, LNG, gas-to-liquids (GTL), as well as the growing applications of bio fuels, have lead to probably the strongest growth ever in the industry. This raises the question of whether suppliers of technologies, equipment and services for separation towers can cope with the growing demand and what the resulting challenges are?

GROWTH IN ENERGY CONSUMPTION

In recent years the primary energy consumption recorded the strongest incremental growth ever, with growth rates for 2004 above the 10-year average in all regions and for all fuels. The traditional imbalance of oil and gas supply and demand with North America, Europe, China and Southeast Asia as net importer of oil and gas, and Canada, South America, Former Soviet Union, Africa and Middle East as exporters will remain as a fact for the future.

The extensive growth in energy consumption has lead today to a high capacity utilization of existing production facilities around the world, and to a significant capacity expansion of the oil and gas industries.

These intense growth and investment activities has brought the industries' capacities in various areas to its limits:

1. People constraints
2. Higher material prices and longer delivery times
3. Availability of resources such as labor and equipment
4. Increased construction and production costs

MARKET TRENDS

It is expected that the cost for energy in general will remain high or may even increase further during the years to come based on oil prices which have already broken the

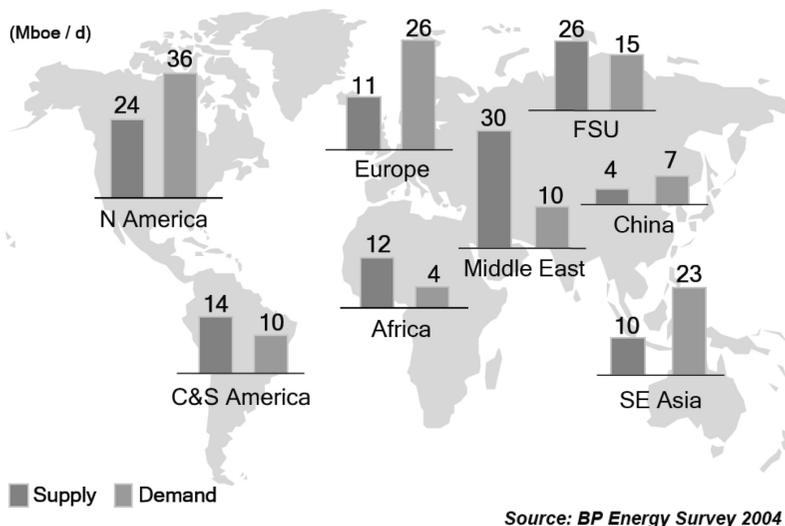


Figure 1. Oil and gas supply and demand imbalance

barrier of \$70 per barrel. During the coming decades the gap between new oil discoveries and the level of production will further diverge and therefore will further emphasize the need for the finding of alternative energy sources. The drive for alternative fuels based on natural gas, ethanol, biological sources and others, as well as environmental regulations requiring low sulphur content and different fuel composition will draw huge investments in the years ahead.

As we are all aware that the reporting of oil and gas reserves and potential of new discoveries must always be viewed with some caution. The simple questions

1. What if China continues its rapid development? or
2. What if India emerges in a similar way to China?

may give us a sense of what kind of investment and development activities will be required to cope with the increasing demand.

TECHNOLOGY TRENDS

Increasing energy cost, tightening raw material resources and increasingly stringent environmental regulations as mentioned earlier will drive the development of new technologies and applications. These development will affect the reaction and the separation technology fields. Developments in reaction technology and catalysts will thus target at improving selectivity and conversion of the reaction process in order to reduce downstream processing requirements. Developments in separation technology will aim

Table 1. Major investment areas

<p>Middle East</p> <ul style="list-style-type: none"> ■ Oil production – Saudi, Arabia, UAE and Kuwait ■ Gas processing – UAE and Saudi Arabia ■ LNG production – Qatar ■ Downstream refining and petrochemical – Saudi Arabia, Kuwait, UAE and Qatar 	<p>North America</p> <ul style="list-style-type: none"> ■ Clean fuels – U.S. and Canada ■ Oil sands – Canada ■ Refinery expansion – U.S.
<p>Russia and the Caspian</p> <ul style="list-style-type: none"> ■ Oil production – Caspian Sea/Siberia ■ Gas production – Siberia 	<p>Africa</p> <ul style="list-style-type: none"> ■ LNG production – North and West Coast ■ Offshore oil production – West Coast
<p>Asia</p> <ul style="list-style-type: none"> ■ Petroleum and Chemical – India and China ■ LNG – Indonesia and Australia 	

at reducing energy consumption while at the same time coping with increasing product purity demand.

The technologies of heat integration and heat pumps, which were developed during the times of high oil prices in the seventies and eighties, might revive. Hybrid separations – combinations of different separation technologies – like the combination of reactive distillation or distillation with pervaporation will more and more find their way into industrial practice. Various presentations of this conference talk about this topic.

Furthermore distillation column components will continue to be optimized for capacity and efficiency. More and more niches will be filled with tailored solutions to meet individual separation requirements. New plants to be built, will continue to increase in size, in order to make use of economies of scale. This will stretch the physical limits of equipment design and manufacturing as well as the limits of transportation and installation of larger components.

Computational fluid dynamics (CFD) is already today an important tool for the development of new products and is expected to play an even more important role in the future as progress in 2-phase flow simulation is made.

GLOBALIZATION

The challenges related to globalization have become a matter of fact by now. Another emerging term is “The Flat World” as described by the American journalist Thomas L. Friedman. Behind the term stands the awareness that markets cannot any longer be captured regionally but need to be viewed globally. This conclusion is valid for products

and plants as well as for services. Mobility, shorter travel time and the communication web around the world are resulting in regional barriers disappearing.

CHALLENGES AND OPPORTUNITIES

What does all of this mean to us? Are we as technology and equipment suppliers, as well as service providers in the field of distillation and absorption technology, affected by all these trends and developments? The simple answer is – what else could it be – yes.

Above all, the present market environment and the prospects for the years ahead provide vast opportunities. These include opportunities to participate in the anticipated growth with existing products and technologies, development of new applications, products and technologies, to benefit from changing requirements, entry to markets which were not in existence, or markets where it was not possible to be active before.

However in order to become and remain successful an organization has

1. To capture market opportunities wherever they are
2. To be flexible and alert to changing markets and customer requirements.

When one looks at the challenges an organization faces, one has to differentiate between external and internal factors. External factors include the economic and political environment, the competition, and the relationship with suppliers and customers. Internal factors are based on the market or strategic positioning of the organization, structure and processes, and last but not least, people issues.

Whereas the economic environment today looks rather favorable with tremendous opportunities for growth as described earlier, influences and consequences of geopolitical

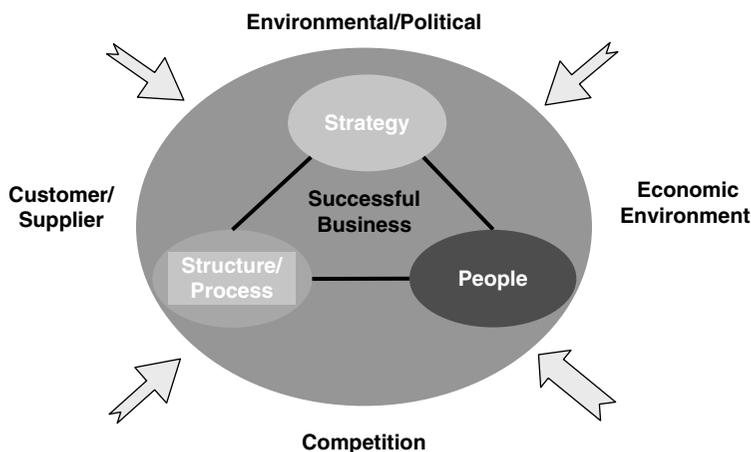
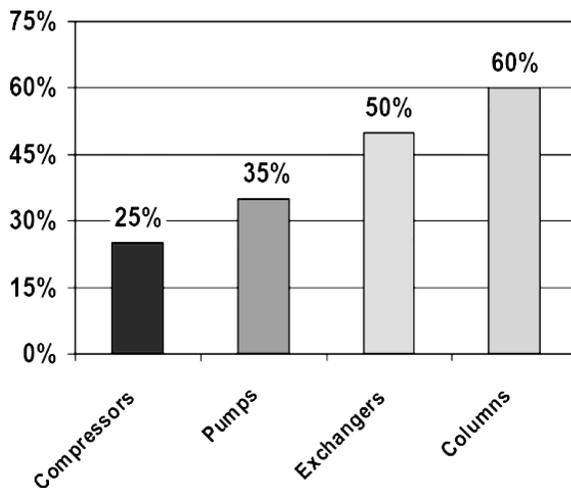


Figure 2. External and internal factors



Source: Project Management Institute

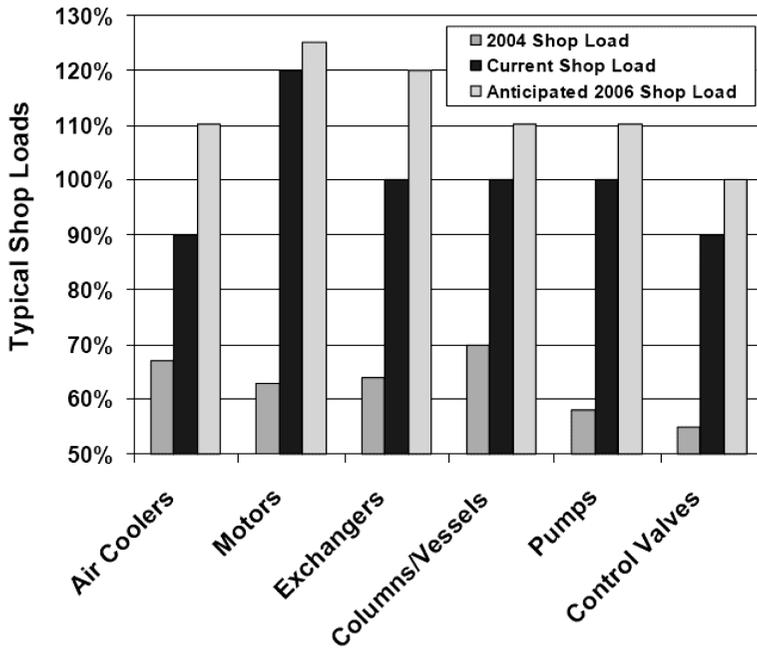
Figure 3. Price increases since 2003 to present for major process equipment

tensions pose a risk factor which is difficult to predict. The competitive environment will remain challenging in the future. More suppliers will be emerging from new local markets with critical issues regarding intellectual property protection, and projects being awarded to less qualified contractors and suppliers. It is expected that for the foreseeable future the supply chain will continue to be faced with volatile commodity, material and equipment prices, and strained delivery schedules.

For customers and plant owners the time-to-market factor is becoming increasingly important to the economics of a project. Consequently competence, reliability, and availability of resources become an important success factor for a supplier. From a legal perspective dealing with contract risks such as establishing clarity of terms and conditions, and protection against consequential damages, has become an essential part of the business life in order to safeguard the future and the stability of the organization.

From the organizations' internal perspective, the three factors – market positioning, structure and processes, as well as people – are equally important in order to achieve sustainable success. Needless to say, different strategies will lead to success, albeit different in magnitude. In the following I want to further emphasize on the aspect of structure and people.

In the early 90's Sulzer Chemtech was primarily established in Switzerland and The Netherlands accounting probably for 80% of the workforce. The small set up in Singapore was merely seen as an exotic place in the organizational landscape. Today it is a matter of fact that state of the art engineering, production and service platforms are established in



Source: Global Supply Trends

Figure 4. Process equipment manufacturing capacity utilization

places like Mexico, China and India. Not only has two thirds of the business volume shifted outside Europe, but at the same time the number of employees outside Europe are accounting for two thirds of the total workforce. Closeness to customers and the markets, and flexibility in the supply chain management, are key factors for today's success of any organization.

The ongoing growth results in the needs to increase appropriate people resources. As market complexity grows, and demand from customers increases, the right people are required to develop and provide solutions and services. In summary we could say it is all about

1. People being the key resource for success
2. People's competency
3. Accountability of individuals and teams
4. Leadership

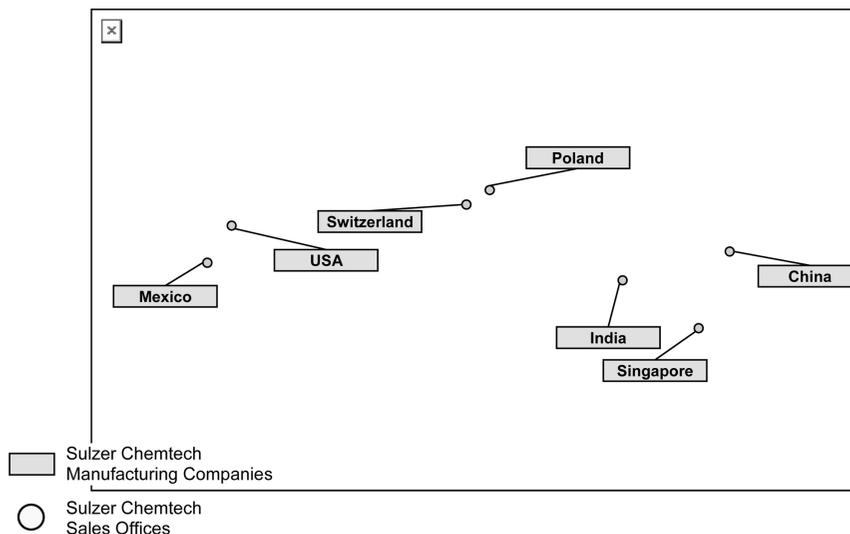


Figure 5. Global organization structure sulzer chemtech

In this context developing and retaining existing talent is important. In new markets and developing countries young, motivated and ambitious talents are emerging and need to be integrated into the global organization structure and its processes. Comprehensive training programs are critical to achieve the required levels of quality, establish and enhance competence, and to maintain and increase, if possible, productivity. The last point is particularly important as salaries and benefits will rise, which can only be sustained if productivity increases are in line with rising costs. Automation and standardization of tools as well as comprehensive global communication becomes increasingly important. Last but not least flexibility and mobility of individuals and leadership teams has to become part of the global perspective of the organization.

CONCLUSION AND SUMMARY

The coming years will bring substantial opportunities and challenges for the suppliers of technology, equipment and services for separation towers. Keys for success will be, among others:

1. Adapting to changing market and customer requirements
2. Global view with regard to business issues and resources
3. Comprehensive risk management as part of each contract
4. Hire, train and retain key people
5. Increased standardization and automation