Forthcoming papers

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Proceedings of the Groningen (1999) conference 'Groningen – catalyst for the North-West European oil and gas industry'

Guest editors: H. Dronkert & E. Dijkhuis

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Gas: Source of prosperity

Ms. A. Jorritsma-Lebbink

Minister of Economic Affairs (opening address)

The Slochteren gas field has not only made a great contribution to the prosperity of The Netherlands, but it has also led to changes to this country in the socioeconomic sense. In a comparatively short time natural gas became the main fuel for our energy supply. That meant a major switch in manufacturing industry, public utilities and households.

On hearing the term 'natural gas', the average Dutch person immediately thinks of Slochteren. However, even so, Slochteren is far from being the sole source of Dutch gas. Quite a long time ago the government decided to develop the smaller fields with priority. This gave the Groningen field the role of 'balancing field', to be conserved for as long as possible for future use. That was a wise decision.

It was also a wise move to apply the gas revenues for broader purposes than social improvements alone. We have used those revenues in order to consolidate our economic and infrastructural base as well. We are already enjoying the resultant benefits today, and we shall continue to enjoy them in the future.

Since its setting-up in 1962, Gasunie has played a great and pivotal role in the Dutch natural gas supply. Moreover, that role is far from being played out yet. New challenges lie ahead of you. Step by step, the gas industry is being liberalized. Thanks to the European Union the gas trade has gained a European dimension. We see a complex network of trans-European pipelines being built.

Together, we – Gasunie, other market players and government – must respond effectively to those new developments. Then Dutch natural gas production and trade will remain what they have always been: a source of prosperity and sustainable economic development.

Groningen field, past, present and future

H.J.M. Roels

Managing Director, NAM

A summary will be presented of the key milestones in the development of the Groningen field. From discovery in 1959, through its rapid development during the sixties and seventies, the subsequent production decline as result of the "Small Fields Policy", its current balancing role, the recent construction of two Underground Gas Storages and finally the Groningen Long Term project.

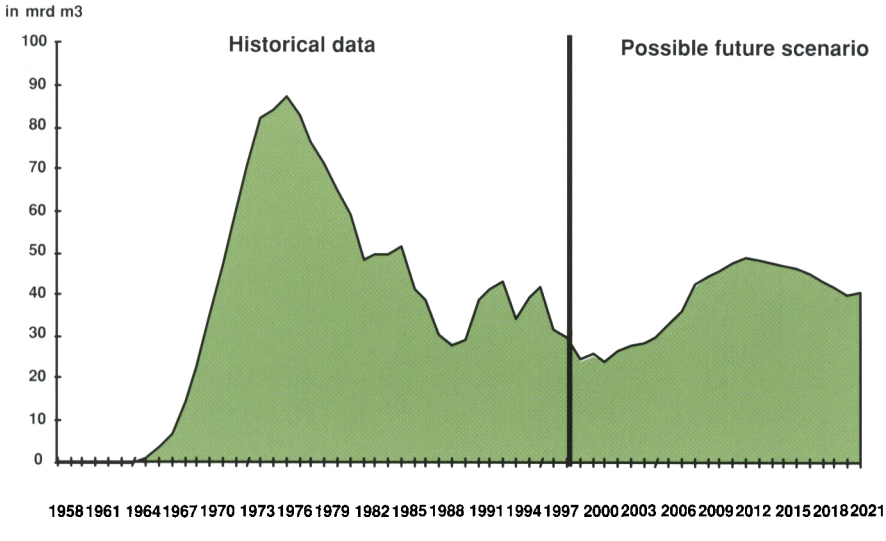
The past

With the discovery in 1959, the giant Groningen field rapidly became the favorite energy supplier in The Netherlands and neighboring countries:

The Present

Over time, more and more small fields were added to the Dutch gas portfolio. However, Groningen still produces some 50% of the Dutch annual production whilst providing the ever important balancing function:

In 1998, the Groningen reservoir operated by some 250 field staff, produced its 1500 billionth m^3 and is now more then half empty. To allow the continued functionality of the Groningen System despite its reduced reservoir pressure, three underground gas storages (UGS) were recently completed in Alkmaar (operated by BP Amoco), at Grijpskerk and at Langelo. The Langelo and Grijpskerk storages are amongst the largest in the world. To meet the most severe peak demand, the Groningen system including its three gas storages, is currently capable of producing at a rate of over 500 million m^3/d, with the ability to "ramp-up" its production rate by 120 mln m^3/d in less then an hour.



In the early seventies this trend was reversed with the development of the "Small Fields Policy" where incentives were provided to the private industry to explore and produce small gas accumulations. In this development, the Groningen field takes the role of balance supplier of volume and capacity. The small fields being developed economically through allowing high load-factor production with Groningen providing the balance between (heavily fluctuating) demand and supply. Up till now, the small fields have added some 1300 billion m^3 to the Dutch reserves. Reserves, which wouldn't have been developed without the back-up of Groningen.

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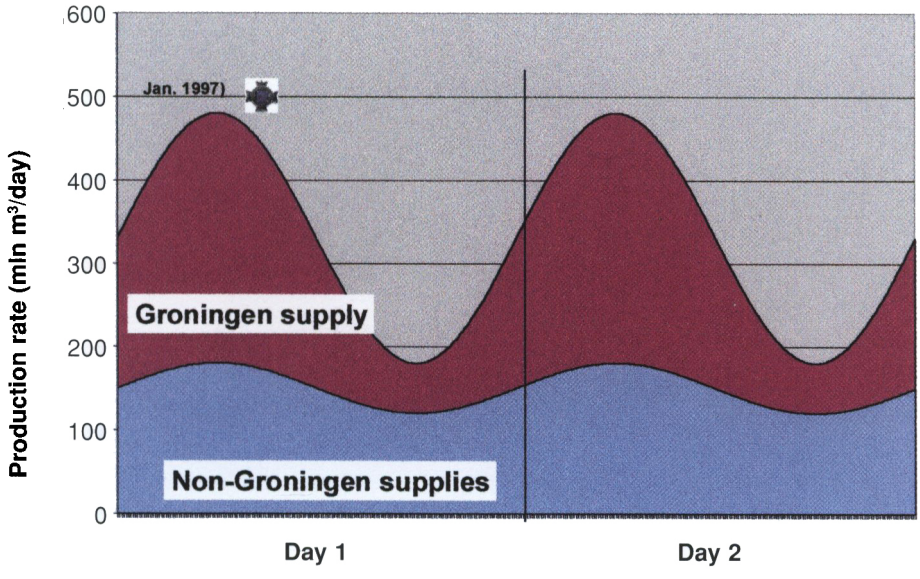
January '97 Production swings Groningen and Non-Groningen supplies

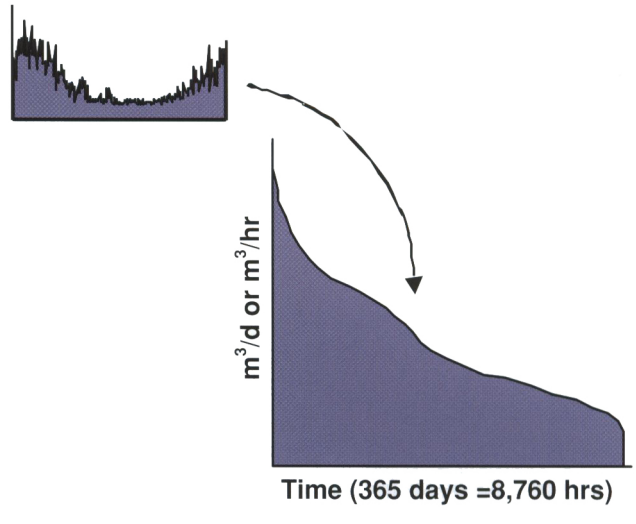


NAM guarantees Gasunie reliability for the gas supply from the Groningen system, that translates into a maximum of one hour "downtime" in fifty years allowing industry as well as private consumers to rely on security of energy supply. It goes without saying that, thus far, the system has never failed! To ensure the function of the Groningen system in providing balance volume, balance capacity and "ramp-up", to date, some Nfl 16 billion has been invested in the system.

The Future

To allow the Groningen System to continue its current role, 25-year future demand scenarios are built. These scenarios represent the previously mentioned daily, weekly and seasonal demands for each individual year. These scenarios are then translated in "Load Duration Curves" which define both the capacity (the left axis) as well as the volume demand (the area underneath) requirements:

The Load Duration Curve



Currently, the load duration curve is "filled" with the Gasunie LNG plant at the top, the three UGSs below that and the small fields at the bottom. The area in-between represents the capabilities of the Groningen system, both in volume and capacity supply. However, due to the continuing declining reservoir pressure we foresee a gap arising early in the next millenium, which will require additional capacity measures in the Groningen field. We have therefore embarked on the so-called GLT (Groningen Long Term) program, providing compression on each of the field locations. Through this latest program of compression installation, Groningen, which is already the heart of the Dutch circulation system for primary energy, will be

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Tjuchem Compressor (23 MW)

given a new lease of life. That heart will quicken and slow its electrically powered beat as the country awakes, works, feeds and rests. For decades to come.

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Groningen, Gasunie and the gas market

G.H.B. Verberg

General Managing Director, NV Nederlandse Gasunie

When the Groningen field was discovered, 40 years ago, the public attention was mainly drawn to the size of this legendary field. During the years, estimations about its content rose from 60 billion cubic meters at the time to 2,900 billion cubic meters now. In the perception of the general public these impressive figures symbolized first and foremost the country's energy position in terms of long term security of supply. Within a short period of time, the Netherlands changed from a small-sized country, that had average Western-European worries about its energy independence to a king-size gas country that only had to worry about the way it should utilize its newly disclosed energy wealth. A government policy was carefully designed to manage Holland's natural gas reserves in a way that would serve national economic interests at best and to safeguard security of supply for a long-term period. In 1963 Gasunie was established to perform this task.

Right from the start it seemed obvious to link the price of gas to energy alternatives, such as heating oil and heavy fuel oil ('market value principle').

Apart from its size a second aspect characterized the Groningen-field as a unique field: its flexibility. Unlike the size of the field, this aspect was not that much a front-page topic for the national dailies, but it was nevertheless recognized by the professionals within the gas industry as a matter of great importance: the field's flexibility. This meant that a complete market could be developed: not only industries and power stations, but also millions of households, a market sector that would require a highly flexible supply pattern. Thanks to its impressive capacity, 'Groningen' could meet any peak or low in domestic household demand, thus providing short-term security of supply. Today, natural gas accounts for over 50% of the Dutch primary energy consumption.

It is this same flexibility that would contribute to the meaning of the Groningen field in the development of the Western European gas market. In the portfolio of Gasunie export customers the flexible contracts with Gasunie represent a source of flexibility, needed to enhance short-term security of supply in Europe. At this moment Gasunie has a share of 24% of total EU gas consumption.

During the seventies a government policy was put forward to bring on stream other gas fields apart from Groningen as far as possible – a move, which became known as the 'small fields policy'. The idea behind it was to enable the Groningen field to continue performing its balancing role of accommodating demand fluctuations for as long as possible.

Over the years 'Groningen' has determined to a great extent Gasunie's profile in the European gas market. The field's image of flexibility provided, as an 'ingredient brand', Gasunie with a strong 'corporate brand' in the market. Today, at the eve of the 21st century the European gas market is in a state of flux. The arrival of gas via the Interconnector pipeline and from other sources marks the beginning of an era of competition, also on Gasunie's home market. Gasunie has anticipated this: among other measures, Gasunie recently introduced a new tariff system (CSS), which offers customers a made-to-measure package whereby gas, transmission services and capacity services are supplied as separate components. Looking at the future, it is to be expected, that flexibility will continue to be a crucial asset for a successful market performance on the increasingly competitive European market. The outlook for the European gas market is one of steady growth. To meet future demand, additional gas will have to be brought to Western Europe from remote sources in Russia, Norway and North Africa. As a result there will be mention of an increasing share of inflexible long-distance supplies. This will bring along an increasing need for flexibility in the market.

Fluctuations in the market demand can not be counterbalanced by high load factor suppliers such as Norway and Russia, and must therefore be purchased from other sources, for instance Gasunie, creating market opportunities for Gasunie as a service provider.

The position of the Groningen field as a swing supplier may be declining, due to its decreasing reservoir pressure. At the same time the importance of artificial capacity in the form of underground storages is increasing. Thus, Gasunie will be able to maintain its position as a flexibility provider. It is safe to say that Groningen has enabled Gasunie to establish a reputation, with which the company can continue its role as a major player in the European market.

Non-Groningen gas supplies for Western Europe

P. Mellbye

Executive Vice President, Statoil.

The sustained growth in natural gas demand in Western Europe is foreseen to persist throughout the next decades. Producers will seek to match the natural gas demand growth by developing their considerable untapped natural gas resources. However, as uncommitted mature resources start to dwindle, likely candidates to match the long-term natural gas demand growth are increasingly further away from the market. The ultimate consequence is increasing long-term marginal supply costs to the market, not only in terms of transportation costs due to increased distances, but also in terms of development and exploitation costs in frontier regions.

Producers have traditionally required long-term guarantees in order to ensure recovery of their capital costs. Considerable investments are required to develop natural gas resources and deliver these to the market. This guarantee has traditionally been provided through the so-called take or pay (TOP) mechanism in the natural gas sales contracts. In the traditional gas contracts the natural gas price is indexed against the price of substitute sources of energy (to a large extent crude oil or oil products). These contracts allocate the volume risk to the purchasing companies in the market and the price risk to the producers.

However, the prevailing energy prices (particularly those of crude oil) are hardly enticing for the development of high risk natural gas resources.

The enactment of the EU Gas Directive induces a legislative framework, that complicates the establishment of TOP sales contracts, which have served to mitigate the producer's risk inherent to the development of natural gas resources. The development of further supply projects to the market will of course be determined by economic considerations, as part of the producers finding the right balance between risks and rewards remains the central issue.

The presently prevailing expectations of low energy prices and potential increases in volume risk, as a consequence of the process of deregulation, may lead to a long term market equilibrium at a lower level of natural gas demand than what we like to project.

The development of resources on the Norwegian Continental Shelf (NCS) is also influenced by the aforementioned environment. However, the NCS displays a well integrated transport system which will provide a firm basis for the tapping of the region's recourses.

Lower prices and higher risks will shift the focus from developing new frontier areas to smaller finds closer to existing infrastructures. A consequence will be falling Reserves/Production ratios and potential questions as to long term security of supply.

Past, present and future of the gas market in the North Sea region

Ms A.C. Quinn

Managing Director, BP Amoco Gas Marketing Ltd.

While gas markets served by town gas and some reserves of natural gas were well-established in Europe by the mid-nineteenth century, they were largely concentrated in urban areas with supplies insufficient to justify the national and international transport networks, that underpin the Europe-wide gas market, that we see today.

All this was to change with the discovery of significant quantities of natural gas within and adjacent to Europe after the second world war and in particular the birth of a North Sea natural gas industry commencing with Groningen in 1959 and later followed by the British, Norwegian and other gas sectors of the North Sea.

These discoveries heralded the transformation from localized town gas networks to major natural gas systems and with the spread of first national and then international transportation networks within Europe, significant markets for North Sea gas emerged and grew rapidly.

And yet an early, defining feature of these markets was a perception of natural gas as a scarce, relatively high cost premium resource which, would need to be supplemented by the import of less secure and higher cost imports outside of the North Sea region. This perception set the framework for the evolution of the 'managed' approach to markets in gas, that Europe has seen throughout the last 40 years; with state participation in or influence upon the gas chain and in particular via major gas import/ transportation monopolies as well as municipal participation in monopoly utility provision at the distribution level. It has also meant that North Sea natural gas was largely sold only into high value end-use markets in many European countries and not in the generation of base load electricity.

It was not until the 1990's, that a number of factors began to bring new thinking and change to this managed approach to European gas markets. New political agendas, ever greater international competitiveness, significant growth in gas reserves, and rising environmental concerns are among a number of elements that are today driving fundamental change in not just gas, but the broader energy markets of Europe and beyond.

This paper explores that process – from the managed markets stimulated and served so reliably by North Sea gas over 40 years to the changes that have occurred in recent years. It examines the current developments as member states enact legislation to implement the energy Directives nationally and adopt new structures for the effective regulation of their markets in a competitive era. It looks at the new players, who have emerged and the new markets for North Sea gas, in particular in power generation.

And it assesses the future market prospects for North Sea gas in European markets and the growing environmental agenda before concluding with a positive vision of the prospects for natural gas and natural gas markets in and around the North Sea region.

Groningen in the European context

Ch. Burgos

Director-General, DGXVII (Energy), European Commission

40 years ago, when the Groningen gas field was discovered, it was impossible to foresee the impact and significance of the field both for The Netherlands as well as for Europe. In 1959, the Dutch gas reserves were estimated at around 60 billion cubic meters, which at the time caused excitement. Since then, the Dutch gas industry has brought some 2,000 billion cubic meters out of the ground and delivered these to customers on the domestic and export markets. Despite this, the remaining total expected gas reserves today are at around 2,500 billion cubic meters, which is enough to meet Gasunie's supply commitments at home and abroad until 2025, by which date several hundred billions of cubic meters would still be left in the ground. Only time will tell how these reserves will develop.

The role of the Groningen field in the buildup of an integrated European gas grid has been significant. Groningen has been one of the few giant gas fields or regional clusters of gas fields in Europe, which 30-40 years ago started a process of expansion and integration in the European gas sector.

Although declining in absolute annual output, the Groningen field is still the backbone of Dutch gas supply and will remain so far into the future. In addition, its swing capabilities will be maintained and it will be able to contribute to what the Dutch gas industry is so known for and capable of: providing flexibility.

Dutch gas exports to its neighboring countries started in 1965 and have increased ever since. Dutch gas will continue to play a pivotal role in Europe's gas supply also in the coming decades and not only in Western Europe, but also further to the east.

Representing more than 50% of the EU's gas reserves, Dutch gas reserves play an essential role in the European gas market and will contribute significantly both to the functioning of the internal gas market and to the EU's long-term security of supply of gas.

The European energy landscape is under rapid transformation these years with the internal energy market being completed. The entry into force in August 1998 of the Gas Directive will have a major impact on the organization of the European gas sector and the trade of gas. Change may happen sooner rather than later. The dynamics of the markets are already there and the EU Gas Directive will accelerate this.

The ambition goes beyond that of liberalizing 15 national gas markets. The objective is to create one single EU Market for gas and there is therefore a need to ensure, that the different choices, which will be made by Member States, are compatible with the overall objectives and principles of a Single Market.

The Commission and the Member States are working closely together in a spirit of partnership to ensure a coherent and efficient transposition of the Directive into national legislation. During the process of implementation of the Directive, there will also be close contacts with the gas industry, gas sector regulators, consumer associations and other interested parties.

The change from closed to liberalized markets will present both customers and gas companies with new challenges and opportunities. The role of Government here is to ensure, that markets are working efficiently and giving true signals to guide the participants in interpreting and managing change, while maintaining the appropriate level of security of supply.

The Groningen field is an asset value for the Dutch gas industry. The Dutch gas sector often presents itself as "Hub Holland" largely due to the flexibility characteristics of the Groningen field, which will benefit the EU gas consumers in general and play an important role also in the context of the EU single gas market.

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Gas: government and market

N. van Hulst

Director-General Energy, Ministry of Economic Affairs

As minister Jorritsma mentioned in her speech this morning, gas is a major source of prosperity for The Netherlands up to this very day.

A unique form of collaboration between government and industry assured this prosperity. What future can be foreseen for this collaboration, now liberalization and market mechanisms are the key words in the European energy scene?

The Netherlands are convinced of the benefits of liberalization, ordaining, however, a wise transition scenario,. The relationship between Government and industry will change. On the one hand, the Government will maintain its special interest because of the gas revenues. On the other hand, Government involvement will be reduced.

The Government wishes to ensure, that the energy companies can continue their excellent work in a liberalized market, in a responsible way. That is the reason for introducing a new Mining Act: to integrate and update the current multitude of regulations; to introduce regulations governing the detrimental effects of soil movements; to formulate regulations for gas storage and the removal of platforms. A new contribution system will be introduced, easing the financial burden for some mining companies and in any case simplifying it for the entire industry.

The new Gas Act is the direct result of the EC Gas Directive, which the Dutch helped formulate. The focus will shift to a demand-oriented structure. Competition between gas suppliers will increase, shifting the emphasis to the "additional services" of the various companies.

Step-wise opening up of the market, for the time being distribution companies will be obliged to keep supplying their established customers. A system of negotiated access to the gas pipeline networks has been chosen. The Netherlands Competition Authority will play a key part as supervising authority.

The gas price for industry will be cut, maybe even for private consumers, although many other factors will affect the gas price as well.

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Groningen – its impact on European society

R.F.M. Lubbers

Chairman of the Mining Council, former Prime Minister of the Netherlands

In May 1973 I became Minister of Economic Affairs. That Ministry was and is responsible for energy. Those days "Groningen" was at the beginning of its lifetime. The first oil crisis of the second half of that year had an enormous impact on policies in The Netherlands and in Europe. In The Netherlands it was not only about overcoming the inconveniences of the oil crisis in the short term; it was also about structural consequences. One of them was the re-negotiation of profit sharing.

What had begun as a 70/30 split was changed already before I became minister (under Minister Langman) into an additional bracket, from a certain price level, of 85/15. I negotiated an additional bracket of 95/05. Today, with the very low energy-prices this seems to be ages ago.

Another important change in policy was to go for a systematic to take advantage of Groningen for as long a time as possible. More concretely, the ambition became to have always enough gas for a generation to come (thirty years). In practical terms this limited sales contracts, more in particular export contracts. This policy had to be understood in connection with a policy of energy saving (as formulated in the first white paper on energy in 1974). This energy saving was a more general objective but it had its concrete consequences for the world of gas.

How to be selective in the use of the precious gas; and how to be as gas-saving as possible in those applications where, gas was the best alternative. If we compare the reality in the decades after this first white paper on energy (gas) with the ambitions in that white paper, the remarkable outcome is, that we did better than we thought those days (though the ambitions of those days were considered to be rather over-optimistic, too political, too rosy).

In connection with the ambition to have always enough gas for one Dutch generation, we made not only a plea to improve technology in order to take more benefit of Groningen, but also to develop the so-called "small fields", on the main land, in the North Sea and the "Waddenzee" (!).

When I left office as Prime Minister in August 1994, twenty-one years after I entered office as a Minister of Economic Affairs, the remaining reserves in terms of how many years still available for the Dutch population, the balance was: "still the same".

Therefore one might state, that the combination of policies in terms of conservation, improved technology and combining the potential of the 'small fields" with Groningen was indeed successful.

I don't like to bore you with the whole history from 1973 till 1999, but it is an understatement to say that we are now living in a different world. Groningen had an enormous impact during decades on the energy supply in Western Europe; it still has.

At the very same time, the combination of conservation and improved technologies has produced an implosion of energy prices. Liberalization of markets – think also about electricity generation – has brought a buyer's market. Because of the relevance of energy prices and the change in energy prices this is all good news for economic growth. At the very same time it is risky for stability.

How long will there be an abundance or are we once again wrong in our predictions ?

And how to cope with climate change? Is it a serious problem and if so, what policies are needed to formulate the right answers?

And finally, what is the meaning of energy in general and gas in particular for Europe?

Some ten years ago I proposed the Energy Charter. Finally it developed into a rather modest Energy Charter Treaty. I make use of this opportunity to state, that it was a mistake not to go forward with the more ambitious concept of the Energy Charter. The ambition to leave it all to the market has been certainly one of the reasons of the disasters in the former Soviet Union. Chernobyl did not teach us a lesson.

Still, it's not too late.

Energy could still function as an instrument of integration and stability in the European continent. This

is not only about energy, it is also about safety and the environment.

Groningen is now very mature; it is not at the end of its lifetime, but it is playing a more modest role in The Netherlands and in Europe; but still we can play a role in an integrated European approach.

But a conference such as this one can be used not only to tell the stories of the past, but also to formulate perspectives for the future.