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*Pipeline Economics in 1992
The Common Carriage Proposal –
Implications and Alternatives*



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ABOUT THIS REPORT

With the introduction of the Single Market in 1992, the EC Commission has put its attention to the role of the natural gas transmission companies. It considers the introduction of a common carriage system in order to regulate what they call de facto monopolies in the market. This paper outlines that governmental regulations is often needed for natural gas pipelines to operate efficiently. This is because they have significant elements of natural monopoly. The paper lists a number of issues that has to be clarified in order to make the actors in the market able to evaluate the Common Carriage proposal. However, whatever design that will be assigned to the system, it seems clear that it will require a more active position in the market place for Norway as a gas exporter.

This paper was presented at the International Association of Energy Economics' (IAEE) conference Oslo-Kiel 29.9-2.10.1989.

ABOUT THE AUTHOR

Ole Gunnar Austvik is trained as an economist at the University of Oslo (Cand.Oecon 1980) and he has a Master in Public Administration from John F. Kennedy School of Government, Harvard University (MPA 1989). He was a senior executive officer in the Central Bureau of Statistics 1981-85. Since 1985 he has been a researcher at the Norwegian Institute of International Affairs (NUPI) concentrating on energy economics and energy policy issues.

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Pipeline Economics in 1992

Common Carriage - Its Implications and Alternatives¹

In this presentation I shall make some remarks on the economics of natural gas pipelines and the regulation objectives and problems in connection with the Common Carriage proposal from the EC Commission. I shall also mention some possible alternative means to achieve the goals the Commission has set up as well as pose some questions on how a common carriage arrangement may function in the Western European gas market structure.

INTRODUCTION

Transmission of natural gas is to a large extent dominated by monopolies. In the American gas market attempts to regulate these have been met with strong resistance from the companies involved. Large profit margins with low risks made it worth-while for the companies to fight in order to maintain their positions.

¹ The presentation is based on extracts from the authors' seminar paper at John F. Kennedy School of Government, Harvard University June 1989: "Europe 1992 - Introduction of Common Carriage for Natural Gas?".

On the other hand, producers and distributors in the U.S. was interested in getting a larger proportion of the profit as well as having easier access to the pipelines. Together with the federal government's desire for a more flexible and better functioning grid in the gas market, the regulative efforts went on in spite of the protests.

The struggle was fought for half a century with trials, new laws, regulations and deregulations. Only as late as in the eighties it seems to have become less of a fight. A Common Carriage system was introduced in the mid-eighties. Together with an expanded network of pipelines and, thus, increased competition, it have contributed to a more acceptable distribution of profits and risks in the market. The larger network has increased efficiency and flexibility and demand for gas has increased rather substantially over the last few years.

THE EUROPEAN COMMON MARKET

Now the EC Commission has put its attention to the issue. The introduction of the Single Market in 1992 assumes free movement of labor, capital, goods and services. The Commission perceives that certain conditions in the Western European gas market is not functioning according to the idea of the Single Market (EC Commission Working Document May 1988: "The Internal Energy

Market") :

"The biggest barriers to the free movement of gas in Europe are government control of natural gas imports and exports and undertakings holding a monopoly or dominant position enabling them to block movements of natural gas".

And the Commission expands further on the transportation sector:

"Transport of gas in the Member States is characterized by the existence of statutory or de facto monopolies in the market place. Only in West Germany there are a number of actors but even here there is only one dominant transport enterprise.....The presence of dominant or monopoly transmission undertakings in each Member State gives rise to segmentation of the Community market; these undertakings can restrict the through transport of gas and even, when no specific legislation exists, can block the import and export of gas."

On the basis of this description of today's situation, the Commission is considering the introduction of a Common Carriage system for natural gas in the European Community. Such a system should have open access for everybody wanting to use it. The pipeline can take a tariff covering their expenses and normal profits. But they can not charge tariffs including economic profit (profit exceeding normal profit). The Commission has assumed that a larger and more flexible gas network has the potential to increase the attraction of natural gas for consumers. Security of supply can be increased as well as consumption as a result of

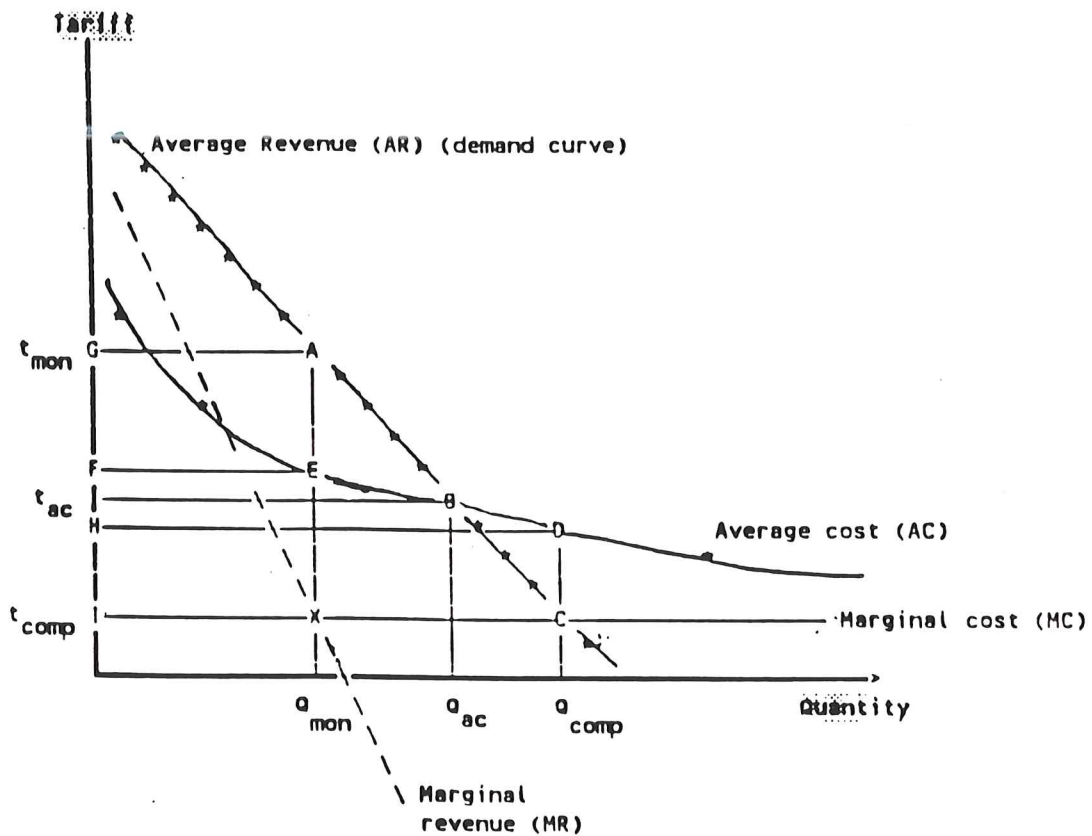
removing what they call "bottlenecks" in the system.

Why does transportation of natural gas often lead to needs or wishes for specific regulations?

PIPELINE ECONOMICS

The huge investment needed to construct a pipeline leads to decreasing costs with the scale of operation. Therefore pipelines are subject to significant elements of natural monopoly. It is a natural monopoly because it is usually cheaper for one pipeline to provide transportation service over a specific distance and relevant quantities transported than for two or more firms. Obviously, a market with such technological economies of scale tends to evolve toward very high concentration. The natural monopoly can achieve high return on its investments, especially if demand is sufficiently inelastic. A pipeline without competitors can restrict output in order to earn more than normal profits.

Natural Gas Pipeline; Decreasing costs with the scale of operation:



A monopolistically behaving pipeline will restrict its service to the point where marginal revenue equals marginal costs ($MC=MR$), illustrated by the point X in the graph. Production will be Q_{mon} and at this quantity consumers are willing to pay the price, or tariff, t_{mon} . If the pipeline increased the quantity of service provided, its marginal cost would be higher than its marginal revenue, and it would lose money on the margin. On the other hand, as quantity is increased, the firm will, in terms of efficiency, be more optimal. But as long as it is the only pipeline serving the distance, it is better off by not increasing service beyond Q_{mon} .

where its profit is the largest.

If the pipeline should go break even, price should equal average costs ($AC=AR$ in point B). The pipeline would earn normal profit but no economic profit. This point is in efficiency terms better than the monopoly solution. But it is still inferior to point C as customers would be willing to pay for the incremental service as $AR>MC$ up to quantity Q_{comp} . Average costs would still be decreasing as quantity increased. If the pipeline should produce at the most efficient level, price should equal marginal costs ($MC=MR$), represented by the point C. The problem is that, for a natural monopoly, this price would be less than average costs. The pipeline would suffer a loss, and no transportation would, in fact, be provided, unless someone was willing to pay the deficit.

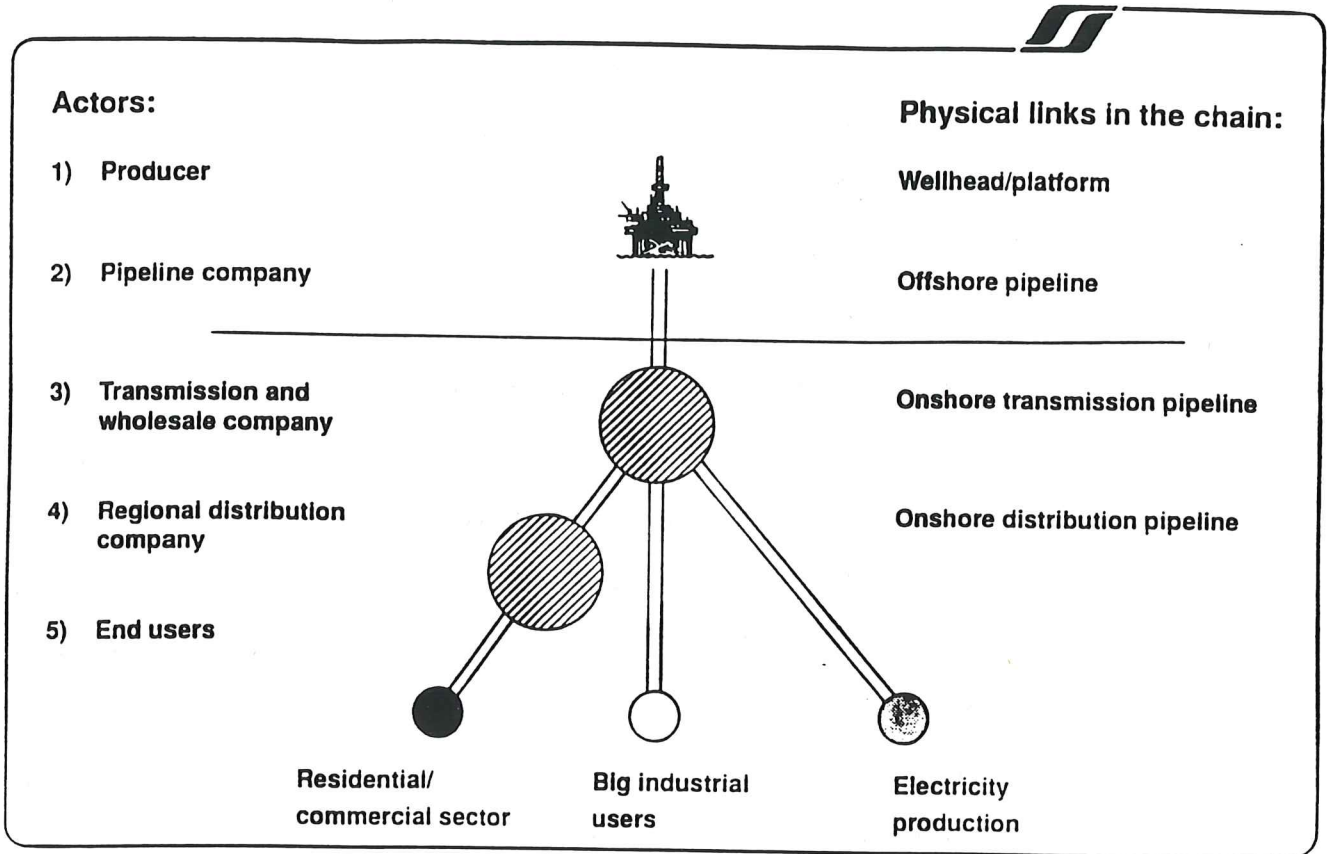
What should be the goal of the regulation? Should service be provided at the most efficient level where price equals marginal costs (point C) and the government pay the loss? This has often been the European solution to a natural monopoly; often a governmental ownership. Or should some regulatory institution set the price = AC as often has been the U.S. solution? Or should some other principles be applied?

A Common Carriage arrangement will set the tariff equal to average costs in the system. Thus, the proposal is in this respect a follow-up of U.S. traditions in the regulation of natural

monopolies. I shall mention some of the aspects that have to be clarified in order to evaluate the Common Carriage idea, many of them taken from the U.S. experience. I also mention these factors in order to illustrate how complicated the matter is. It may give some answers to why the regulatory agency, as the FERC in the U.S., easily becomes large bureaucracies. Before I turn to this, however, one question must be answered: To which extent can the U.S. experiences be applied to the situation in Western Europe?

THE STRUCTURE OF THE MARKET

In the Western European gas market, there are three main groups of power concentration: Producer, transmitter and distributor.



Source: Saga Petroleum

As the EC Commission describes, each of them are characterized by a strong concentration of firms, often monopolies. Thus, not only the pipeline can exercise monopoly power. The producers and distributors may also, to a variable extent, do this. This is in contrast to the U.S. gas market, a market which is characterized by thousands of producers and numerous distributors.

In Western Europe, inelasticities both in the supply and demand for gas and transportation services give each of the actors the possibility to influence profit and risks if they have a sufficiently strong position in the market.

Another difference to the American gas market is that the transmission lines in Europe are crossing numerous countries' borders. The huge amount of money and often long-term contracts, are mixing foreign political and trade relations into the issue. Inter-state relations in the U.S. are replaced with international relations inside Europe. Not everybody agrees that the EC will be able to play the role of the U.S. federal government in this area. On the other hand, maybe they will?

Even though in Western Europe, the market structure, the political and not least the juridical area are different from in the U.S., a gas pipeline is nevertheless a natural monopoly here as well as there. Thus, in my description of some of the important technical issues to consider regarding a common carriage proposal, I think that U.S. experiences can be of some help.

THE DESIGN OF A COMMON CARRIAGE ARRANGEMENT

A main element in a Common Carriage arrangement is that the pipeline shall not act as a trader of gas. It shall only provide

transportation services at a reasonable price. This does not, however, preclude the possibility of finding mixed solutions. For example, the pipeline can act as a trader if it at the same time is obliged to transport the gas at a reasonable price if distributor and producer have the wish to do so. But the pipeline cannot refuse to serve a customer. And it cannot discriminate between customers.

The idea is that the producer and distributor shall make direct contracts. They shall pay a reasonable tariff to use the pipeline, like a toll road. A reasonable tariff is usually assumed to be average costs + normal profits but no economic, or monopoly, profit. Even if these general ideas are quite clear, numerous problems arise. I shall mention some of them:

1. What is a reasonable tariff? Average costs in a natural monopoly are decreasing with the use of capacity. A pipeline with half of its capacity filled may have a substantially higher average cost than when it operates to full capacity.
2. Which depreciation period to use? The shorter the period the higher the tariff.
3. How shall average costs be recovered? Shall everybody be charged the same rate or should the pipeline discriminate on

the basis of customers' inelasticity of demand, either by season or sector.

4. How to allocate excess demand? When demand exceeds capacity, not everybody can get their gas transported. In the U.S. different methods have been used; a pro rata system, some sort of priority or firm versus interruptible contracting of the service.
5. Who shall decide how large the capacity is? If it resides with the pipeline, it can downgrade the capacity in order to exploit inelasticities of demand and use some degree of monopoly power towards the gas owners.
6. How shall new capacity be priced? The average cost of the existing pipeline will obviously not be enough to cover the average cost of a new pipeline with newer and more expensive capital. Should the cost of the new pipeline be rolled into all old tariffs? Or should each pipeline be priced independently according to its costs?
7. How large should the capacity be? Corrected for uncertainty, a new pipeline project should give a positive net present value at an appropriate discount rate. With society's usually lower discount rates compared to the private sector, mainly because of a more overall view of the national and EC

economies than private businesses has, a project can give a positive net present value for the public sector at the same time as it gives a negative one for the private sector. This could give arguments for both subsidies (as was done in Canada) and even publicly owned pipelines.

If all these aspects are solved, question marks are still left. A pure common carriage regime will change the role of the European pipelines to such an extent that one could say that the existing customers for Norwegian gas may disappear in their present form. Even if the pipelines will still be allowed to perform as traders, the contracts may have to be renegotiated according to the new rules of the game in the market.

On the other hand, possibilities for increased contact with local and national distribution companies, power plants and large industrial users will be easier. Direct and new contracts can be signed. The situation of no pipeline access, as I understand has been the case in the Norwegian - Austrian gas deal, would become a smaller problem. The Common Carriage arrangement would, however, imply the necessity of increasing the downstream network and marketing for a producing country like Norway.

Before I make some final remarks on Common Carriage in the context of the Western European gas market, I will mention two other ways to increase flexibility and decrease transportation costs in the

market.

ALTERNATIVES TO COMMON CARRIAGE

Lack of competition is a major reason for considering the introduction of some sort of Common Carriage arrangement. We have touched upon a few technical-economic reasons why this competition is lacking. However, in parts of the market "enough" competition may exist. Considering the often large regulative costs, there should be less need for regulation of pipelines with competitors. In fact, if competition could be increased at strategically important distances, one could avoid regulations of today's monopoly pipelines. Obviously, the costs of regulations have to be withdrawn from the benefits that the regulation creates in order to evaluate the possible net benefits.

Another approach is to change the property rights of the pipeline. Economists usually take the bundle of property rights as a datum and ask for an explanation of the forces determining the price and the number of units of goods to which these rights attach. But a pipeline is behaving monopolistically because its owner has an interest in maximizing profit in the pipeline. By changing the property rights, the new owners may have different goals than profit-maximum for the pipeline alone. If the owner of the pipeline has overall efficiency in society, or maximum profit in the

distribution or production sector, as a goal, profit maximum for the pipeline may not be in the owners interest. Under new property rights schedules are public ownership and the system of producers or distributors being undershippers in the pipeline possible alternatives.

COMMON CARRIAGE AND THE MARKET STRUCTURE

We have now touched upon a few reasons why transmission pipelines for natural gas may tend to behave monopolistically. We have also discussed some of the important issues that need clarifications in a possible regulative process. Finally we have mentioned a couple of alternatives to common carriage. In my opinion, there should be an interest in establishing common carriage in the market. But there is no easy once-and-for all solutions, and we have only mentioned some of the issues to be solved. Therefore, also increased competition and individual evaluation of each situation should be considered and be an important part of the process to establish a new and possibly more efficient regime in the market.

As we already mentioned, however, there are significant differences in the structures between the U.S. and European gas markets. Will the old monopoly structure only be replaced with a new monopoly structure consisting of producers and import firms? The pipelines themselves will, of course, be suffering from such a regime if it

works according to the premises of the proposal. And what about the prices at different stages in the market?

In my opinion, there is no reason to believe that the transmission companies today do not take the best price possible from the distribution companies and other customers. It seems unlikely that producers should be able to charge specifically higher prices from the customers than the transmission lines does today. Whether the prices will remain the same or decrease, will to a large extent depend on the positions of importers and exporters in the market. Obviously, there are good reasons for importing countries to maintain their import monopolies in order to counteract a possible producers' market power.

With a market structure like the one in Western Europe, the change may be only marginal for many actors. Therefore it is logical that the EC Commission also considers how to regulate producers' and importers' monopolies. But as long as the EC countries mostly are importers of gas, and the most important exporting countries are non-EC members (like Norway, the Soviet Union and Algeria), a deregulation of producers oligopoly may prove to be difficult. Therefore some sort of monopsony power should, from consuming countries' point of view, be maintained in order to balance the producers in the market.

One argument that is posed against the Common Carriage proposal is

that the long-term stability for producers in today's contracts with the transmission lines will be challenged. However, these contracts are long term and stable mainly because consumers have a rather stable use of natural gas. It is difficult to see that this stability cannot be maintained by signing contracts with the customers directly rather than indirectly, through the transmission lines, as it is today.

I shall leave these question open for further discussion. I think, nevertheless, from a Norwegian point of view, we should modestly favor a Common Carriage arrangement. If the proposal goes into effect, however, it is important for Norway to simultaneously increase the activity in the markets, get a portfolio of direct customers, stabilize incomes and increase sales. But as this presentation has tried to outline, the details need thorough clarifications before any final opinion really can be made.

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