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Technical Cooperation Programme
"Promotion and Development of a
Market-based Gas Industry in
Economies in Transition - Gas Centre"

SEMINAR ON NATURAL GAS RATE-MAKING IN ECONOMIES IN TRANSITION: MODELLING ELEMENTS OF MARKET-BASED NATURAL GAS PRICING
Amsterdam, 25-27 November 1997

Note by the secretariat

1. The present note reflects the presentations made by the speakers and the subsequent discussion at the Seminar on Natural Gas Rate-making in Economies in Transition: Modelling Elements of Market-based Natural Gas Pricing held at the Hotel Park, Amsterdam, from 25 to 27 November 1997.

A. Mandate

2. The UN/ECE Technical Cooperation Programme "Promotion and Development of a Market-based Gas Industry in Economies in Transition - Gas Centre" was given a mandate in 1994 to assist in transferring knowledge of market-based gas pricing to economies in transition. In late 1995, the Advisory Board of the Gas Centre decided at its first meeting that the Training Manual on Gas Rate-making and Pricing should be developed for economies in transition. As a first step, a draft of the Reference book on natural gas rate-making was completed and submitted to the Advisory Board for its approval in December 1997. In parallel, the work on the Training Manual has progressed well, with the first relevant results available by the end of 1997.

3. The Training Manual is prepared by the Gas Centre Task Force in an interactive way among representatives from the natural gas industry both in market economies and in economies in transition. The main aim of such an approach is to reconcile needs in economies in transition and the particular nature of market-based rate-making in principle and in its application.

4. The first interactive seminar on the reference book/textbook and manual was held in Amsterdam on 20-22 May 1997. The seminar focused on a transition towards market-based natural gas rate-making in the former socialist countries. A modular approach was used describing a wide range of aspects and complexity of rate-making. After the successful completion of the Seminar, participants requested that another such event be organized, preferably by the end of 1997, based on the progress on the Manual achieved by the Task Force.

5. In such a framework, the Gas Centre decided to organize the second interactive seminar on the Natural Gas Price Training Manual in Amsterdam on 25-27 November 1997. The Seminar was designed to focus exclusively on modelling of natural gas price transition in countries of eastern and central Europe and of the Commonwealth of Independent States. The interactive nature of the Seminar should assist in judging the efficiency of the proposed modelling. It could later be used in each individual country as a framework and for the desired price transition and as a teaching tool in its simplest form. At this stage, macroeconomic and microeconomic links will be incorporated.

B. Status

6. The Seminar was organized in close cooperation between the Gas Centre and Dutch national gas corporation, N.V. Nederlandse Gasunie, Groningen. As it had done for the first Amsterdam Seminar, Gasunie in addition provided substantial financial and in-kind support to the event and in particular to participants from economies in transition.

C. Attendance

7. The Seminar was attended by 38 participants from 17 countries: Albania, Austria, Bulgaria, Croatia, Czech Republic, Hungary, Latvia, Lithuania, Netherlands, Poland, Romania, Russian Federation, Slovakia, Slovenia, Tunisia, Turkey and United Kingdom. A representative of ECE was also in attendance. About 70% of participants were from countries with economies in transition, whose participation was made possible to a great extent by Gasunie’s generous efforts.

D. Opening ceremonies

8. Mr. Rob van Dorssen, Project Manager of Gasunie, welcomed participants and underlined that the presence of a large number of countries with economies in transition was encouraging for the future work on the project. He invited participants to take an active part in the event, which was a prerequisite for its success and referred to the previous Amsterdam workshop where the phrase “co-designing” had been introduced, which could be the key to developing and designing the modelling on natural gas rate-making.

9. A representative of ECE also welcomed participants and invited them to participate actively in the programme of the event which had brought success to the first Seminar on the issue.

10. Mr. Aat van Steenderen, Senior Advisor, N.V. Gasunie, introduced a game with balls and juggling which was performed by all participants. The game not only contributed to the successful socialization of participants but also indicated selected topics to be dealt within the programme of the Seminar.

E. Programme

11. The Seminar was divided into nine sessions. The first two sessions provided an introduction and the last two focused exclusively on co-designing, while the other five sessions were the backbone of this event:

Welcome and getting acquainted
Introduction to the Seminar
Cost-based rate-making
Cost-based rate-making, cost allocation and tariff design
Energy markets
Macro-economic environment
Game and role-play
Conclusions on the Training Manual and evaluation
Future shape of the Training Manual

Introduction to the Seminar

12. Mr. van Dorssen briefed participants on the current state of the Training Manual project, stressing that in December 1995 the Advisory Board of the Gas Centre decided that a Training Manual on Gas Rate-making should be produced. In June 1996 a Task Force and an Editorial Board were established to monitor the progress of the project. In the second half of the year the work on the Reference Book on Gas Pricing in the ECE Region began. Already completed, this

300-page document consisted of a wide range of contributions from North America, western Europe and countries with economies in transition providing a tremendous amount of information on natural gas rate-making. The proceedings of the first workshop on the Training Manual (Amsterdam, May 1997), an integral part of the Training Manual project, had just been published in the ECE Gas Centre Series. Finally, work on modelling was progressing with selected tangible results to be achieved in 1998.

13. Mr. Van Dorssen informed participants that during the event they would have the opportunity to work with the computer model for natural gas price transition consisting of four modules:

Cost-based rate-making;
Cost-based rate-making, cost allocation and tariff design;
Energy markets; and
Macro-economic environment.

14. The model should be seen as an illustration of how a wide range of aspects relevant to rate-making could be translated into a consistent set of relationships. The model is only in a preliminary form being subject to verification, comments, suggestions and changes based on joint efforts during the Seminar and later. At the end, participants were advised that in most of the sessions they would be asked to work in subgroups. There would be five subgroups with two portable computers in each of them.

15. The organizers of the event prepared a series of exercises based on a fictitious country named Transmethania, considered to be a typical country with an economy in transition. Its political, economic and energy framework, together with a glossary of the most important terms used in this kind of analysis, was provided to participants.

Cost-based rate-making

16. Cost-based rate-making, introduced by Mr. Teun Tielen, Manager, Gasunie, is widely used in the gas industry of the ECE region. Probably the most frequently used form is a cost-of-service approach based on extensive regulation and the cost-of-service study done by the applicant i.e. a gas company. The study normally attempts to identify justified cost of service for various classes of customers and to establish a rate design which would take into account different considerations including the energy policy elements. As such, it includes five steps: cost determination, cost functionalization, cost classification, cost allocation and rate design. There are many issues to be resolved and many assumptions to be made before such a study could be completed. Among several critical issues, three usually occupy a prominent place: establishment of cost base (value of assets), depreciation clauses and allowed rate of return.

17. Within the computer model, participants were asked to make a quick evaluation of the gas industry assets in their countries, based on their own estimates and using benchmarks developed by the Editorial Board and stored in computers for: national transmission grid, regional transmission grid, compressor stations, underground storage facilities, local distribution grid and hook-ups to households. In the second step, an estimation was made of the capital cost for those assets in US dollars per 1000 cubic metres for various countries with economies in transition. The structure of the total value of the assets for the average of 14 countries was as follows: national transmission 33%, regional transmission 25%, compression 7%, underground storage facilities 3%, local distribution 24% and households hook-ups 9% with considerable differences among individual countries. Average annual capital cost per 1000 cubic metres varied considerably among individual countries: from 5 US dollars to 85-115 US dollars.

Cost-based rate-making: allocation and tariff design

18. After determination of the total cost of service (CAPEX, OPEX, taxes and allowed profit) cost functionalization apportions the total cost along the natural gas chain such as procurement, transmission, storage facilities and distribution. Cost classification, being the next step, tries to establish the fixed and variable costs of the service and to distinguish between mileaged and non-mileaged cost elements. Those costs should be transformed into demand, customer and commodity charges. The cost allocation and rate design steps, although separate, are closely linked. Although cost allocation serves as the base for rate design, the company’s goals with its rate design could determine how costs are allocated. The number of different rate designs which could be created, each serving various (social) goals, is certainly high.

19. The theory was put into practice in a case study which was offered in the second part of this session focusing on different gas consumption profiles of various consumers, such as a low load factor consumer, an interruptible user only in the summer and a high load factor client. Various solutions for cost allocation among them were considered as well as different pricing techniques employed.

Energy markets

20. Since natural gas is subject to intensive competition on the total energy market, its pricing has to take into account various considerations in addition to pure cost(-of-service) calculation. Interfuel competition, national energy policy, environmental policy, cost/revenue and subsidy/tax relationships and ratios for each energy sector, sustainable energy demand and energy savings are probably the most important factors which might influence the competitive position of natural gas. In general, it is considered

desirable to achieve a level playing field for all the different fuels in each market segment such as industry, households, power generation and transportation. Energy and environmental policy have become interrelated at least in selected countries. Three instruments were mentioned for conducting energy policy from an environmental perspective: limits on emissions, regulations (regarding fuel use) and taxation. Although in principle undesirable, various explicit and implicit subsidies are sometimes used in the implementation of different elements of energy policy.

21. Participants were asked to work with the computer model on the energy situation in the household sector in five subgroups. Five different energy carriers were considered. Using different variables, the model was employed to analyse different consumption scenarios for the sector with the main goal to reduce government subsidies. The model calculated not only the fuel cost but also operating and capital costs. Participants were supposed to take into account, among other factors, environmental policy, social aspects and the potential for energy savings. Redirecting the flow of subsidies, away from the gas industry and to the government, was another important element of this session.

Macro-economic environment

22. The economic environment interacts with the whole energy sector and the gas industry. Any model which claims to describe and simulate natural gas markets necessarily has to include macroeconomic and microeconomic frameworks. Prices, income and the general state of the economy are among the key elements influencing the energy market and the competitive position of natural gas. Considerable economic adjustments made in the past and still on the agenda of almost all economies in transition could provoke economy-wide changes with the readjustment of key economic variables. In turn, it might affect the whole energy sector and its segments such as the gas industry.

23. The part of the total rate-making model on the macro-economic environment was aimed at simulating required or desirable changes in the economy and their impact on energy and gas industry consumption and price patterns. As an exercise, participants were asked to simulate consequent economy-wide changes in Transmethania and Marketia, another fictitious but more developed economy in transition, after a relatively important budget deficit had to be removed. Different wage levels, current and expected gas prices and assumed elasticities played the key role in the exercise. Wages differed considerably in individual countries of southern, central and eastern Europe. For example, in the first half of 1997, the gross monthly industrial wage in Bulgaria and Romania was only 78 and 118 US dollars respectively, while in Slovenia it reached 774 US dollars.

Game and role-play

24. The use of a game or a role-play in the Seminar programme had different goals. Firstly, it was a playful way to summarize the presented information. Secondly, it was a bridge between abstract matters and real-life situations. Consequently, participants were asked to assume the roles of the different dominant players in the Transmethania gas market and to gain some understanding of their interests and incentives. Thirdly, it was used to enhance the awareness of the dynamics that work when people meet to accomplish a task such as decision-making on gas prices. A “Three-level model” was used distinguishing between content, procedural and process levels which had to be analysed. The assumption was that the mere knowledge of contents was not sufficient to get an idea or proposal accepted or to find compromises with other players.

25. Participants working in country-groups were asked to identify and to rank major players in the gas industry in their countries. The idea behind the exercise was that successful behaviour in a negotiating process depends to a great extent on a good understanding of the role of dominant players in the field and of their interests and incentives. In the majority of countries with economies in transition one or more ministries, sometimes in combination with parliamentary bodies were regarded as the key players. The gas companies often play a limited role, with restricted ability to influence the governmental decision-making process. Participants felt that macro-economic considerations held the key to successful restructuring of the energy market in their countries. Perhaps it was logical since only after macro-economic stability is reached might the gas industry be given the scope to act freely in the domestic economy.

Conclusions on the Training Manual and evaluation

26. In the framework of a co-designing role, participants in five subgroups formed at the beginning of the Seminar were asked to comment on the Seminar programme and in particular on the preliminary computer model used.

27. Although participants made different comments for various modules (one to four) of the model they could, however, be summarized as follows. First, the model could be regarded as interesting and instructive. Although only a preliminary version, it was considered as a unique and productive tool both for the decision-makers in governments and for gas industry management. Second, the use of benchmarks in the model was welcomed. Third, the model should incorporate all sectors of energy consumption, beyond the household sector. Fourth, more tailor-made work might be needed, especially in the third and fourth modules, if the model was to be applied in individual countries. Fifth, there was not enough time to go into all necessary details offered in

the model. Sixth, various technical and substantive suggestions were made for improving the model.

28. As in the previous Seminar in May 1997, a scoring method, where participants put dots on a line having negative and positive segments, was used for the evaluation of this event. At the end of the first working day, the line indicated that the opinion of the group was positive but with somewhat mixed feelings. At the end of the second day, the line showed on average an 80% level of satisfaction.

Future shape of the Training Manual

29. Based on participants' inputs and the results of the previous Seminar, the Editorial Board summarized the views on the future shape of the Training Manual and/or the Training Course, both being used interchangeably. While the name "Training Manual" might suggest that the whole exercise would be based on the "paper-work" seeking answers in the books so far available on a variety of different questions and problems, the name "Training Course" certainly did not cover all the instruments used by the Editorial Board.

30. While the structure of the whole training process had been set in May 1997, the focus was on the Training Course itself, which should probably be held once or twice a year with a duration of four to five days. Its structure would be the same or at least very similar to this Seminar with modelling as the backbone.

31. The participants agreed that at the forthcoming Training Courses the number of participants, preferably involved in the decision-making, should be reduced to 20-25. It was suggested that the Course should be organized for a small group of similar countries and even for selected individual countries. At this stage, although not excluded, interpretation from and into English was not seen appropriate.

Conclusions and recommendations

32. The main conclusions were as follows:

(a) The Training Manual Project on the Natural Gas Rate-making, to which a large number of major oil and gas companies and selected Governments have contributed considerably, delivered a range of original products to be used by the natural gas industry and Governments, in particular from countries with economies in transition: Reference Book on Natural Gas Rate-making in the ECE region, (Handbook on) Issues in Market-based Natural Gas Pricing in Economies in Transition - Transfer of Knowledge and its Application and a preliminary computerized model on simulation of natural gas rate-making in the appropriate framework.

(b) In addition, a concept for the Annual Training Course on the Natural Gas Rate-making of the ECE Gas Centre was developed and a preliminary help-desk facility was put at the disposal of countries with economies in transition. The range of products provided could be used both as training tools and as strong analytical and policy instruments. In conclusion, the Training Manual Project could be considered as a very successful undertaking of the Gas Centre and its member companies.

(c) The Seminar itself was judged as successful by participants with an important contribution to a better understanding of natural gas rate-making in a competitive energy market in the ECE region. It provided a suitable introduction to the complex process of modelling changes in natural gas pricing in the gas industry both in countries with economies in transition and in market economies.

(d) The Seminar was structured in a such way that the work on the application of the model framework to various countries was combined with an active exchange of information on respective gas price policies among participants. This practice had to be continued in the future.

33. The following recommendations were adopted :

(1) The Project on the Training Manual on Natural Gas Rate-making in the ECE Region should continue in three major forms: the Annual Training Course on the Natural Gas Rate-making of the ECE Gas Centre; Help-desk facility for assistance to the gas industry in countries with economies in transition; and by request only the tailor-made application of the model developed by the Editorial Board to individual countries and/or companies.

(2) The model on natural gas rate-making, presented at the Seminar, should be scaled down, simplified and adopted for a friendly educational and training use by the Gas Centre members during the Annual Training Courses. A more extended, tailor-made, version should be used for the implementation phase. Selected changes, as requested by participants, should also be incorporated. Given its complexity, it is expected that another version will be presented at the First Annual Training Course on the Natural Gas Rate-making of the ECE Gas Centre, to be held in mid- or late 1998.

(3) To recommend to the Advisory Board of the Gas Centre to approve the current direction of the work of the Training Manual Project at the 1997 annual meeting as an example of the successful cooperation of various major oil and gas companies in this unique undertaking in the gas industry in the ECE region.

(4) To recommend to the Advisory Board to consider launching the second phase of the Project, preferably in late 1998 or 1999, which would focus on gas contracting issues in the ECE region. The suggested extension of the Project was seen as highly complementary to the gas rate-making issues and as such of high value for the gas industry and involved Governments.

(5) As in the first Seminar held in Amsterdam in May 1997, to invite all interested Governments and natural gas companies in the ECE region, in particular Gas Centre members, to support this major activity for the benefit of the gas industry not only in economies in transition but also in the region as a whole.
