



**Economic and Social Council**

Distr.  
GENERAL

E/CN.3/1987/13  
29 August 1986

ORIGINAL: ENGLISH

STATISTICAL COMMISSION  
Twenty-fourth session  
23 February-4 March 1987  
Item 8 (b) of the provisional agenda\*

INDUSTRY, ENERGY AND ENVIRONMENT STATISTICS: ENERGY STATISTICS

Energy statistics, including statistics on new  
and renewable sources of energy

Report of the Secretary-General

SUMMARY

The present report describes the progress made in energy statistics since the twenty-third session of the Statistical Commission. It contains a description of the current methodological work of the Statistical Office on new and renewable sources of energy (paras. 7-13), energy price and cost statistics (paras. 14-15) and units of measurement and conversion factors (paras. 16-17). Co-operation and co-ordination activities (paras. 18-23) and the data collection and dissemination programme (paras. 24-28) are also outlined. The report concludes with a proposed future programme of work (para. 29-31) and points for discussion (para. 32).

\* E/CN.3/1987/1.

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## INTRODUCTION

1. At its twenty-third session, the Statistical Commission considered the report of the Secretary-General on standards, methods and classifications of energy statistics and the environment statistics programme (E/CN.3/1985/10) and a note by the Secretary-General with updated information on the work of the Statistical Office of the United Nations Secretariat (E/CN.3/1985/CRP.2). The Commission expressed appreciation for the improvements in the quality and quantity of energy statistics. In view of the importance of this issue for developing countries, the Commission encouraged the Statistical Office to continue its methodological work in the area of new and renewable sources of energy and to explore the possibility of developing energy price and cost statistics.

## I. ONGOING METHODOLOGICAL PROJECTS

2. The objective of the methodological work of the Statistical Office of the United Nations Secretariat in energy is to provide concepts, standards and methods to countries which intend to develop or expand their energy statistics data base. The effort is primarily oriented towards the specific needs of developing countries which thus seek to lay the foundations for the planning and decision-making process in the energy sector. As is well known, the energy economy of the vast majority of developing countries is characterized by a dichotomy: energy consumption in the urban centres, along with the industrial and power sector, relies primarily on often imported, fossil-based fuels or hydropower, whereas the rural population depends almost exclusively on traditional forms of energy.

3. Energy planning problems related to the commercial sector often require statistical information linked to energy costing and pricing, and involve issues such as the extent of subsidies or taxes, as well as energy management topics such as the rational use of energy.

4. Energy problems in the rural sector which call for systematic statistical accounting are mostly related to the widening gap between demand and available supply of traditional sources. With the persistent scarcity of fuelwood, still by far the most important traditional energy source, many developing countries are experiencing an increased use of a wide range of organic matter (crop residues, leaves, barks, dung cakes etc.) for rural energy consumption, which often leads to further erosion of the soil. Other relevant sources of traditional energy include draught animal power utilized for agriculture and transport, and, eventually, human muscle power. Common to all these traditional energy sources is their often inefficient use, most notable in the insufficient dissemination of appropriate cooking stoves or the deficiency in devices for draught animal power utilization.

5. Apart from the fossil-based fuels in the commercial sector and the traditional energy sources in households, agriculture and small-scale industry, a number of developing countries have explored the feasibility of using solar and wind energy. The most promising solar applications include solar dryers for agricultural products, collectors for water heating and the use of photovoltaic cells for electricity generation in remote locations. Wind energy is mainly used for

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electricity production and pumping. The assessment process for both sources is still under way, with many countries just improving on their meteorological data series, calibrating their measuring equipment and strengthening their meteorological services etc.

6. The methodological work on energy statistics has, therefore, focused on two aspects: (a) to develop the statistical methodology for collecting and compiling statistics on new and renewable sources of energy (NRSE), and (b) to investigate the possibilities for establishing systems for price and cost statistics for energy. In view of the problems outlined above, the respective work areas have been further subdivided. The conceptual work on NRSE has been structured along the lines of traditional versus novel sources of energy, with the former capturing the bulk of the attention. The work on price and cost statistics was mainly oriented towards evaluating the scope and quality of such data in developing countries and assessing the feasibility of substantial improvements.

#### A. New and renewable sources of energy

7. The work programme in statistics on new and renewable sources of energy, which had been presented in detail to the Statistical Commission at its twenty-third session, is nearing completion. In concluding phase I, which consisted of an assessment of current and planned statistical activities in countries, regional commissions, specialized agencies and other international organizations, the Statistical Office held further consultations with regional commissions, in particular the Economic Commission for Europe (ECE), the Economic and Social Commission for Asia and the Pacific (ESCAP), the Economic Commission for Africa (ECA) and the Economic and Social Commission for Western Asia (ESCWA). The United Nations Environment Programme (UNEP), the International Labour Organisation (ILO) and the World Meteorological Organization (WMO) have been contacted and have contributed their advice. Co-operation with the Food and Agriculture Organization of the United Nations (FAO) has been particularly beneficial in matters related to traditional energy in the agricultural sector (draught animal power) and forestry data.

8. Close co-operation in the methodological field with respect to biomass statistics, as well as wind and solar energy data, has been established with the Commonwealth Science Council (CSC) of the Commonwealth Secretariat in London. The Council is currently carrying out three assessment projects in those areas. The methodological work and the results of the field tests will be available and integrated into the work of the Statistical Office of the United Nations Secretariat.

9. Consultations were held with a large number of energy planners, researchers and statisticians during the course of missions to Egypt, Ethiopia, Iraq, Kenya, Senegal and the United Republic of Tanzania, and with representatives of a dozen Commonwealth countries at the CSC workshop on biomass resources assessments, held at Arusha, United Republic of Tanzania, from 29 June to 5 July 1985. Apart from inquiring about data collection and compilation methods for NRSE, the central aspect emerging from those discussions was related to the institutional arrangements to be created for collecting and compiling NRSE statistics.

10. For the preparation of phase II, a substantial body of methodological concepts for surveys and other data collection procedures, as well as actual data, have been screened and have served to pinpoint problem areas for the refinement of the terms of reference for the consultants. In this context, the Energy Sector Assessment Reports, prepared jointly by the United Nations Development Programme (UNDP) and the World Bank, have been reviewed regarding underlying methodologies for new and renewable energy data presented. The results have provided important guidance for assessing the quality of currently available data on traditional forms of energy.

11. The above-mentioned CSC workshop on biomass resources assessments, which brought together energy researchers and planners from developed and developing countries, provided an opportunity to discuss the first results in the area of biomass methodology. The Statistical Office of the United Nations Secretariat presented a paper entitled "The integration of biomass statistics into overall energy balances". 1/

12. Subsequently, consultants were hired whose reports on draught animal power and on biomass for energy are at this stage virtually completed. Drafts of both reports have been circulated to selected experts for their views. As soon as a sufficient number of comments are received by the Statistical Office, part one of the summary report on traditional energy, to be presented to the ad hoc expert group on NRSE statistics (scheduled to meet in Rome from 29 September to 3 October 1986) will be finalized. A second part, dealing with novel sources of energy, will be completed on the basis of the consultant recommendations for the statistical treatment of wind and solar energy, which will be provided by the Commonwealth Science Council. 2/

13. Phase III of the work programme which foresees the convening of the above-mentioned expert group is to prepare draft recommendations on concepts and methods for the collection and compilation of NRSE statistics and will thus conclude the project in the fourth quarter of 1986.

#### B. Energy price and cost statistics

14. The Statistical Office of the United Nations Secretariat has received a consultant report on energy price and cost statistics in developing countries. 2/ The report assesses the status of currently existing energy data in value terms by referring to the situation in countries of Latin America and the Caribbean. It analyses the reasons for the absence of reliable and consistent data series and notes, in particular, the strong political influences on the prices for petroleum products in the past dozen years. This has often led to a situation where the cost and price structure cannot be statistically portrayed, much less published. Data are to a large extent confidential. The report suggests, therefore, a very modest approach and recommends fairly aggregated formats for energy price questionnaires. As to cost statistics, the flow of information is even scarcer. This is partially due to objective difficulties in collecting data as a result of site-specific cost structures, but again also severely influenced by the unwillingness of Governments to release such information.

15. It is envisaged to use the conclusions from the report for the revision of the technical report Concepts and Methods in Energy Statistics, with Special Reference to Energy Accounts and Balances, which will include chapters on energy statistics in value terms. The questionnaires on price and cost data which were supplied with the report will be forwarded to developing countries, along with the annual questionnaire on energy statistics in 1986.

#### C. Units of measurement and conversion factors

16. The Statistical Office is in the latter stages of preparing a publication entitled Energy Measurement: Units and Conversion Factors. Draft versions have been distributed to selected individuals and institutions for comments and suggestions. Their replies will assist the Office in the finalization of the document during the third quarter of 1986.

17. The publication is intended to serve as a handbook for energy statisticians and energy economists who wish to obtain information on calorific values of fuels and on procedures to convert various original units to a common unit for the compilation of energy statistics. The Statistical Office has given particular attention to this task, since the variety of units and conversion factors used have in the past contributed to distortions of data.

#### II. CO-OPERATION AND CO-ORDINATION WITH REGIONAL COMMISSIONS AND OTHER ORGANIZATIONS

18. A number of activities undertaken by the Statistical Office to increase the co-ordination and co-operation with organizational entities within and outside the United Nations system have already been discussed in the context of the methodological work presented in chapter I. In addition, two arrangements for co-ordinated data collection have been solidified. First, the Statistical Office has agreed to collect and compile energy data for the 24 member countries of the Organisation for Economic Co-operation and Development/International Energy Agency (OECD/IEA) on the basis of the annual questionnaire sent out by that organization. By ceasing to send its own standard questionnaire to those countries, the Statistical Office intends to alleviate their reporting burden to international organizations, an objective stressed repeatedly during the twenty-third session of the Statistical Commission. It is also hoped that certain discrepancies in data arising from the use of different questionnaire formats can thus be eliminated.

19. Secondly, the present arrangement by which the Statistical Office provides current energy data on individual countries to the World Energy Conference and receives, in turn, information on reserves and resources for various fossil fuels will continue. The link to the World Energy Conference has been further strengthened by the Statistical Office becoming a formal member of the National Energy Data Committee, and attending its first working session (London, 13-14 May 1986) in preparation of the thirteenth World Energy Conference in October 1986. The Committee examined some 30 National Energy Data Profiles submitted by national committees to the World Energy Conference.

20. Co-operation and co-ordination continue between the Statistical Office of the United Nations Secretariat and the Statistical Division of ESCAP, especially regarding activities related to the UNDP/ESCAP Regional Energy Development Programme. Two specific areas for increased co-operation within the Programme are (a) the development and improvement of energy data and information systems and (b) its training programme in rural energy statistics.

21. In the area of training, the Statistical Office was involved in carrying out two workshops in China on the compilation of overall energy balances, which were attended by national energy statisticians. The first workshop (Luoyang, Henan Province, 8-12 April 1986) was attended by statisticians from 28 of the 29 Provincial Statistical Bureaux, representatives of the State Statistical Bureau, the State Planning Commission and the Economic Programming Office of the State Council, as well as by representatives of large enterprises of the Province. The central theme of the workshop was energy balance compilation, but discussions were also held on basic data collection and commodity accounts, units and conversion factors and statistics on new and renewable sources of energy.

22. The second workshop (Shanghai, 14-18 April 1986) was held under the auspices of the Statistical Bureau of Shanghai Municipality. It was similar in scope, but also included discussions on energy conservation and management techniques and their statistical treatment.

23. In addition, discussions were held with the State Statistical Bureau in Beijing and Shaanxi Provincial Statistical Bureau in Xian. Those discussions again focused on energy balance compilation, especially problems related to the preparation of subnational or regional energy balances.

### III. DATA COLLECTION AND DISSEMINATION PROGRAMME

24. The Statistical Office has released the second issue of a recurrent publication on energy statistics, entitled Energy Balances and Electricity Profiles 1982. 3/ The publication was expanded to include energy balances for 48 developing countries and areas and shows energy flows from the production of primary energy through the conversion process to the stage of final consumption. With the exception of Egypt, Israel, Jordan, Morocco, the Niger, Qatar and Saudi Arabia, whose data cover the years 1979-1981, and Panama, whose data refer to 1980-1982, data cover the period 1979-1982. Energy balances can be used for a variety of analytical purposes ranging from sectoral energy efficiency studies and the assessment of commercial and traditional energy to cross-country comparisons.

25. Since separate data for the electricity sector are generally more readily available and more accurate than data for the energy economy as a whole, electricity profiles are presented for a total of 79 developing countries and areas covering the years 1977-1982. Apart from showing the final consumption of electricity by sector, these profiles also reflect the fuel input into thermal power plants, thus permitting the calculation of efficiency ratios for those installations.

26. The Statistical Office is in the process of preparing the third issue, entitled Energy Balances and Electricity Profiles 1984, which is planned to be released in the fourth quarter of 1986. The publication will show energy balances for the years 1981-1983 and, wherever possible, for 1984 as well. Electricity profiles will be presented for the years 1979 through 1984.

27. Since the twenty-third session of the Statistical Commission, the Statistical Office has published the Energy Statistics Yearbook 1983 and has prepared the Energy Statistics Yearbook 1984. The information provided covers a broad spectrum of energy-related topics ranging from production, international trade and apparent consumption of various forms of energy to data on capacities, prices and resources. Data in the latest issue are presented for the years 1981 to 1984 for the world, for the regions and for approximately 200 individual countries and areas.

28. The energy data contained in both publication series are also available on magnetic tape and, on special request, in the form of computer printouts. The tape includes energy data as well as heating values of fuels for all years from 1950 onwards.

#### IV. PROPOSED FUTURE PROGRAMME OF WORK

29. In the course of the past few years an increasing number of countries became aware of the need to systematically collect energy data before energy planning could be seriously pursued. In the available UNDP/World Bank Energy Sector Assessment Reports (as of April 1985 missions had been carried out to 59 developing countries) this point has been invariably stressed and remedial action recommended. The experience gathered by the Statistical Office of the United Nations Secretariat during missions to a number of Asian, Latin American, Caribbean and African countries points in the same direction.

30. The national statistical infrastructure for collecting and compiling energy statistics is often insufficient. This involves unco-ordinated attempts to collect data, often leading to duplication of efforts and a lack of comparability of series. Existing data are not easily accessible to users, but remain within the government agency or research institution which initiated the collection. Given the wide range of institutions within a country which are interested in energy matters, it is quite apparent what benefits could be derived from increased co-ordination and co-operation among them. Some countries have therefore started to establish energy planning desks or co-ordinating bodies within ministries or central banks. While this alleviates some of the problems, it does not address the basic lack of financial and human resources for conducting surveys, maintaining records, mailing inquiries and, eventually, checking, compiling and disseminating up-to-date energy statistics.

31. The following elements for a technical assistance programme appear necessary if the objectives, namely (a) improving national energy statistics, and (b) providing internationally comparable data, are to be achieved:



- (a) Provision and training of energy statisticians who actively function as a liaison to the energy planning authority, to the ministries of agriculture and forestry, to the meteorological service, to research institutions etc.;
- (b) Establishment of an information system containing data sources on energy;
- (c) Co-ordination of surveys and, in particular, inclusion of energy-related questions in household, agriculture, transport and industry surveys;
- (d) Training of energy statisticians, with particular emphasis on statistical tools such as energy balances, profiles for new and renewable sources of energy and topics related to energy statistics in value terms.

#### V. POINTS FOR DISCUSSION

32. The Statistical Commission may wish to discuss the following matters relating to the energy statistics programme:

- (a) Methodological work in energy statistics. Guidance regarding the character of publications (recommendations, guidelines, technical reports, etc.) in this area;
- (b) Technical co-operation. Identification of high-priority areas for technical assistance in order to establish and maintain energy data bases for planning in developing countries, particularly in least developed countries.

#### Notes

1/ See Commonwealth Science Council, Assessing Biomass Energy Resources in Developing Countries (London, 1986).

2/ Copies of the draft reports are available for consultation in the Statistical Office.

3/ Previously entitled Energy Balances 1977-1980 and Electricity Profiles 1976-1981 for Selected Developing Countries and Areas.

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