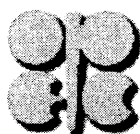




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With Special Focus on Oil Statistics  
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LIBRARY & DOCUMENT SECTION

**OPEC OIL AND GAS STATISTICAL SYSTEM**

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# OPEC OIL AND GAS STATISTICAL SYSTEM

## I. INTRODUCTION

OPEC Oil and Gas Statistical Data management is the main activity carried out within Data Service Department at OPEC Secretariat. This activity involves a complex combination of joint efforts of three DSD Groups, namely: Operation Group (IT support), Development Group (application and programming support) and Statistics Group (Statistical work).

The Operations Group is to provide computer support for in-house users, to make selection and installation of Computer System, to ensure the maintenance of Computer Facilities and to monitor technological development in the Computer Field.

The Development group is to ensure the maintenance of the database, to provide application support and to develop new applications.

As the subject of the workshop is to consider statistical matters, special emphasis is put on the activities of Statistics Group. The objectives of the Statistics Group of DSD are to identify, collect, retrieve and process information in support of the research and analytical activities of the Secretariat and the Member Countries. It also provides the necessary data for meetings and conferences, as well as the forecasts and estimations required for OPEC medium and long-term strategies.

The data source selection is based on a pre-agreed methodology. We distinguish the following main data sources:

- Direct communication,
- National sources,
- International/regional Organizations
- Specialized Publications.

To collect efficiently data, DSD is using the most advanced technologically means currently available, namely:

- Electronic (Internet, CD-ROMs)
- Printed (Questionnaires, Publications, Reports, Faxes).

Once the data is gathered the update of various databases related to the considered areas is carried out according to the agreed methodologies. In view of the DSD's objectives the statistical tasks are divided as follows:

- Macroeconomic Database,
- Oil and Gas reserves;
- Gas balance;
- Oil Supply, Capacity and OECD Trade by commodities;
- World Oil Demand System and Stocks;
- Crude Oil Products Price Information System;

- Netback Calculations & Replacement Value Method (RVM), Refining Database, Transportation Database.
- Energy Database, Composite Barrel, Oil Trade, Financial Market Indicators:

In the following section, the specific means of collecting data, the sources and assumptions / formulas for each database outlined above, are reviewed in detail.

## II. METHODOLOGY

### 1. OPEC MACROECONOMIC DATABASE

#### A. Data received by electronic means from OECD or IMF

The following data is received in form of CD-ROMs or downloaded directly from Internet.

- IMF/International Financial Statistics;
- IMF Direction of Trade Statistics;
- IMF Economic Outlook Database;
- OECD Economic Outlook;
- OECD Main Economic Indicators;
- OECD National Account Statistics;
- World Bank Development indicators;
- EIU Database.

After selection of the required time-series, the specified files are converted according to the OPEC database required classifications and standards. To get clean and usable figures, a system of data selection, data validation and checking is necessary.

The above-listed files contain data for OECD countries and worldwide. However, there is a lack of completeness due to missing countries, time-series or period coverage.

The periodicity of the data reception differs by source. It could be yearly, semi-annual, quarterly, and monthly.

#### B. Consolidated Macroeconomic Database (MACROBASE)

The purpose of creating a Consolidated Macroeconomic Database in one file arose from the need of having complete time-series on a world-wide basis for the main macroeconomic indicators, which can be used as an efficient and internally consistent tool for macroeconomic information to meet the frequent requests for meetings, studies and others.

##### Maintenance of MACROBASE

- **Automatic updates:** Selective extraction of macroeconomic time series from existing files as listed above (IMF, OECD, World Bank).
- **Manual updates:** From various publications containing macroeconomic time series. (**Sources:** UN-Statistical Yearbook and Monthly Bulletin of Statistics; IMF-International Financial Statistics and Country Surveys; EIU Reports; Several other sources).
- **Estimation of Missing Data:** To fill in the missing time-series, estimation of data is necessary. A set of estimation procedures is included in the maintenance application.

### **C. Time series included in MACROBASE**

- Population;
- Nominal GDP (GDP at current prices);
- GDP per Capita;
- Real GDP (GDP at constant prices);
- Real GDP Growth Rate;
- Consumer Price Index;
- Exports FOB;
- Imports CIF;
- Current Account;
- Exchange Rate;
- External Debt;
- Reserves excluding Gold;
- Oil Export Values (for selected countries);
- Oil Import Values (for selected countries);
- Gas Export Values (for selected countries);
- Gas Import Values (for selected countries).

### **D. Gas balance and reserves**

- Natural Gas: Gross Production, Re-injection, Flaring, Other Losses, Exports, and Imports on a worldwide basis (annual data 1960 - present);
- Proven Crude Oil and Natural Gas Reserves, 1960 - present.

### **E. Remarks**

- Continuous improvement of checking procedures for validation of data;
- Preparation of a menu for easy data retrieval for end users related to macroeconomic data;
- Continuous review of the method of estimation of missing data.

## **2. WORLD OIL SUPPLY**

The **Oil Database** covers worldwide crude oil, NGLs and non-conventional oil production. The use of the terms 'production' and 'supply' in the regular OPEC statistical files and reports, pertaining particularly to global oil balance, has been within similar context and understanding utilized in other internationally acknowledged sources (e.g. IEA, PIW, Petroleum Argus, CGES etc.).

### **A. Sources**

- For OECD Countries: National sources, Oil & Gas Journal (OGJ), OECD Monthly Oil Statistics and various secondary sources;
- For Developing Countries:

- OPEC: Monthly fax, Annual Questionnaire, + 10 secondary sources (PIW, CERA, CGES, IEA, EIA, PLatts, MEES, Petroleum Argus, Petrostrategies and Reuters).
- Others DCs: Direct communication, OGJ, national sources and various secondary sources;
- For FSU Other Europe and China: OGJ, Eastern Bloc Energy, Nafte Compass, PlanEcon, PIW, China OGP;
- For oil capacity: PIW (regularly published) Petroleum Argus, CGES, CERA, Kleinwort Benson and other sources.

## **B. Data Coverage**

- OPEC Countries:
  - Annual production since commencement;
  - Monthly crude production, net exports, consumption, stock changes, refinery runs and production ceilings are available since Jan89;
  - Monthly crude production from ten secondary sources (most of them are available since Jan80);
  - Monthly crude capacity starting with January 76.
- Non-OPEC Countries: 66 countries:
  - Annual crude production since 1960, monthly since January 1970;
  - Monthly NGL and Non-conventional production since January 70.

## **C. Reports**

- Production Monitoring Report (Monthly);
- Oil Supply Report (Monthly).

## **D. Remarks**

- Increase usage of detailed direct information;
- Research of reliable data sources for FSU, China and other Europe;
- Unification of product definitions.

## **3. NETBACK CALCULATION, REPLACEMENT VALUE METHOD (RVM), OPEC REFINING DATABASE AND OPEC TRANSPORTATION DATABASE**

### **A. Input data and assumptions:**

- Considered Markets and Refining Yields;
- Product Prices;
- Refining cost: The refining cost considered in RVM is based on short-run costs, which could include the cost of catalysts and other variable costs of refining operation;

- Transportation cost.

## **B. Output and Market Factors:**

- Gross Product Worth (GPW): GPW is the composite value for each crude, it is calculated considering the **product yield** of each barrel and **the prices** of those products in **the spot market**;
- Netback Value: It is to make it comparable with crude price quotations in the market;
- Refiner's profit Margin: It is to show the relative position of each crude in relation to others in each of the eight markets from the point of view of a refiner;
- Quality differentials: It's the difference between the Netbacks of any two crudes or the difference of crude with the basket;
- Geographical differentials: This refers to the difference in value transportation cost of crudes due to their proximity to the consuming markets;
- Total differentials: It is a total of both differentials. Sometimes differentials in all markets are weighted in accordance with their export pattern to come up with a single value for all markets.

## **C. Sources of data and frequency of updating:**

- Spot product Prices: For the oil and products, the main source for the price data is ***Platt's Global Alert*** of Platt's Oilgram (London). Depending on the type of product prices is updated daily, weekly or monthly;
- Product Yields by Crude Stream and Market (OPEC Refinery Optimisation Model, updated on request);
- Short-Run Refinery Cost (Various oil industry sources);
- Port capacity Limitations (Based on weighted average size of tankers, updated on request);
- Freight Costs: - AFRA (updated monthly);
- Spot freight rates (updated daily and monthly);
- Distribution of OPEC Crude Exports by Destination (updated occasionally as requested).

## **D. Others works**

- The OPEC Refining and transportation data are maintained.

## **E. Reports**

The outputs of RVM are used in weekly and monthly markets reports of the Secretariat as well as in the ECB report. They are also used in faxing the information to some Member Countries. Several tables also appear in the Energy Oil Statistics.

## **4. WORLD OIL DEMAND INFORMATION SYSTEM**

World Oil Demand Information System is developed for retrieving, analyzing and communicating annual oil data for over 130 countries, dependencies, and areas of special sovereignty in the world. Since the

system is oriented towards oil demand by country and by products, the user should first select the country of interest.

The system has annual data on oil demand by organisation, by ECB Grouping and by OWEM Grouping. A table is provided for each selected group, showing the oil demand by country.

#### **A. Sources**

- For 29 OECD Countries: Monthly Oil Statistics (IEA) is the main source; National source is used to check information with the main source;
- For Developing Countries;
  - OPEC (Monthly fax, Annual Questionnaire, Energy Statistics and Balance of Non OECD Countries);
  - Others DCs (Energy Statistics and Balance of Non OECD Countries, Direct communication and National sources);
  - For FCPEs and Others Europe (Energy Statistics and Balance of Non OECD Countries). For recent years: China Oil and Gas, Eastern Bloc Energy, PlanEcon Energy Report.

#### **B. Estimation of the TOTAL OIL DEMAND (Formulas and definitions)**

- For OECD: Oil Demand;
- For OPEC & some DCs: Oil Demand;
- For countries where the data is not available: Apparent demand;
- For FCPEs: APPARENT DEMAND APPROACH.

#### **C. Reports**

- Oil Demand & Stocks (monthly);
- Market Indicators (monthly).

#### **D. Remarks**

- Research of more reliable information sources for DCs and FCPEs;
- Revision of information sources concerning FSU and China;

### **STOCKS**

#### **A. Sources**

For OECD:

- IEA: Monthly OIL Statistics. Data is provided with time lag of 2 months
- The data with time lag for 1 month is provided by:
  - US/DOE data;
  - API Monthly Statistics Report (USA);

- Japan Oil Statistics (JAPAN);
- EUROIL Stocks Inventory Report (Europe).

For DCs

- As data for stocks and stocks on water there is no sources available, they are estimated using some approximate ratio.

## B. Estimation of the Oil Stocks

- Components of OECD Stocks;
  - Commercial/Industrial (Company);
  - SPR: Strategic Petroleum Reserves (Government).
- DCs Stocks;
- FCPEs and OPEC stocks are not estimated;
- Stocks on Water: Oil in transit + Oil afloat;

## C. Remarks

- Evaluation of OPEC, FCPEs' and DCs' stocks;
- It is necessary to carry out a study of the impact of the different oil stocks on the oil market.

# 5. PRICE INFORMATION SYSTEM

## A. Basket

OPEC pricing system defines OPEC's reference price as an average basket value of seven representative crudes with equal weights.

The basket prices are available since 1982 on a daily, weekly, monthly, quarterly and yearly basis. In addition to the basket prices, The OPEC Database also contains information on prices of other selected OPEC and non-OPEC crudes.

## B. Source

The main source for the price data is *Platt's Global Alert* of Platt's McGraw Hill situated in London.

The information is retrieved by the *dial-up-system* by the Statistics Group and processed by the Computer group of the DSD. It is now in the process of changing from the *dial-up-system* to the *Internet version*.

## C. Reports

Daily and weekly reports are generated.



## 6. ENERGY DATABASE, COMPOSITE BARREL, OIL TRADE, FINANCIAL MARKET INDICATORS AND ENERGY INDICATORS SERIES

### A. The Energy DATABASE

It is maintained and updated according to the data supported by different sources, mainly, UN, OECD (IEA), BP, Direct Communication. Actual data is available with time lag of two years and estimations are made for these years.

#### Composite Barrel

The project is based on the extensive database on domestic retail product prices and taxes levied on the various refined products. This database is maintained on a monthly/quarterly basis and serves as an input information for composite barrel calculation.

Furthermore, the composite barrel is based on the product consumption structure for a given country (as defined in the energy database).

The composite barrel is then calculated for the final users product price and for the taxes perceived as follows:

$$\begin{aligned} - \text{Composite barrel Price} &= \frac{\sum P_i.C_i}{\sum C_i} \\ - \text{Composite barrel Taxes} &= \frac{\sum T_i.C_i}{\sum C_i} \end{aligned}$$

Where  $P_i$ ,  $C_i$ , and  $T_i$  are retail price, the consumption and the perceived tax of the product  $i$ , respectively.

### B. Reports

- Quarterly composite barrel analysis.

### C. Others works

- Oil Trade - import/export (monthly report);
- Financial market indicators (weekly and monthly reports);
- Production of refined products by country (quarterly report);
- Energy indicator series (yearly report).

### d. Remarks

- Design of new user friendly system of the Oil trade Statistics;
- In order to unify the data available among the Statistics Group, it necessary to link the energy data with other Statistics Group member.

### **III ANNUAL QUESTIONNAIRE AND PROBLEMS ENCOUNTERED IN GATHERING DATA**

The main Direct Communication data source is OPEC Annual Questionnaire as input for reports (ECB, BOG, OPEC Annual Report and MMSC ...), models (OWEM, WORLD ...), publications (ASB, Fact and Figures, EOS, MOMR ...) and database update. With thirteen (13) topics the Annual Questionnaire includes all together 39 tables. For each table there are definitions of categories, description of units, description of columns and the minimum requirement to be filled out. The dispatch of the questionnaire used to be done usually on March each year. After two months MCs get a reminder with an extension of the first deadline by two months. The next reminder is sent after two months to those MCs which have not responded yet, and extends for another two months to fix the final at the end of July. This year, OPEC Secretariat has taken more proactive action, and dispatched this questionnaire earlier end of February and fixed the final deadline by the End of June.

Concerning direct communication data based on the annual questionnaire the main problems are related to low frequency and incompleteness of responses are the most experienced.

In this regard efforts of OPEC Secretariat are very important and consisting on organizations in-house working parties on flows of statistics and cooperating with international organizations on various initiatives aiming to improve the quality of data.

With secondary sources the more frequent problems result from delays and time lag in receipt of publications or data.

#### **CONCLUDING REMARKS**

The main purpose of the DSD is to collect and process the most reliable data, which is to be used in the below-listed main tasks:

- Input to the consolidated different DATABASES
- Preparation of data for meetings (ECB)
- Input data for models (i.e. OWEM)
- Input to different applications (i.e. real price calculations)
- In-house and out-house requests used for studies, etc,
- Preparation of different reports related to the various fields (i.e. Macroeconomic Indicators in G7 Countries, Production Monitoring Report, Daily and Weekly Price report)

Processing data and making it user friendly is not easy to do, it is usually confronted with the following problems:

- Low response rate to questionnaire;
- Diversity of sources raise the problem of selection of data, which induces also the problem of divergence of data even inside of DSD and then in-house;
- No availability of data for certain group of countries (i.e. DCs, FCPE's, FSU);
- Time lagged data.

These problems are palliated using different methods of estimation or sometimes extrapolation and interpolation. Moreover, the problem of the use of certain outdated estimates does exist. It concerns certain ratio and indices, which have been established a long time ago (i.e. oil stock on water, DC's' stocks).

The details of these problems, for each topic, are mentioned above. And for each one some remarks and suggestions for an eventual improvement are made. In view of the importance of the role played by the stocks in the oil market, it seems to be urgent to start by carrying out:

- The revision of the outdated estimates of the **stocks on water** and **in the DC's**.

Furthermore, the following tasks should be carried out as soon as possible:

- Search of new data sources for FCPE's and estimation of their oil stocks;
- Design a new system to unify and harmonise the data available among the considered areas;
- Build and maintain an environmental database. The objective of this database is to compare the environmental policies of the different countries;
- Update the methods of estimation of the missing data.