

IEA Data Training Workshop in South Africa

Pretoria, 11 – 13 October 2010

Why Collect Energy Statistics?

What to Collect?

The IEA Experience

Jean-Yves Garnier
Head, Energy Statistics Division
International Energy Agency



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Any socio-economic category needs statistics to operate. This is also true for energy statistics.

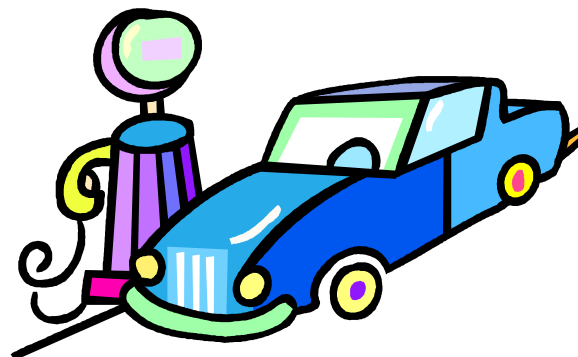
A few examples:

■ Households:

- electricity consumption of houses,
- heating bills,



- mileage of cars,

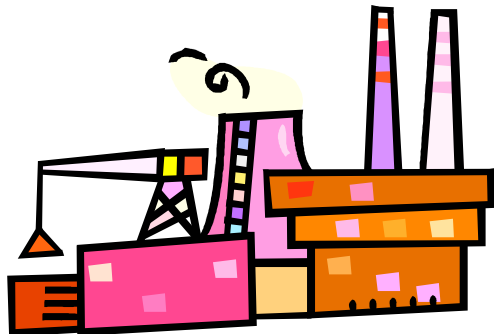


Any socio-economic category needs statistics to operate. This is also true for energy statistics.

A few examples:

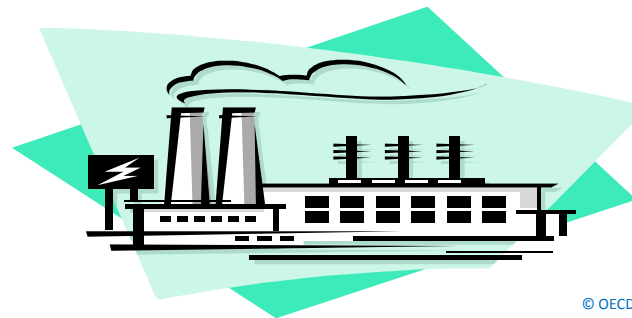
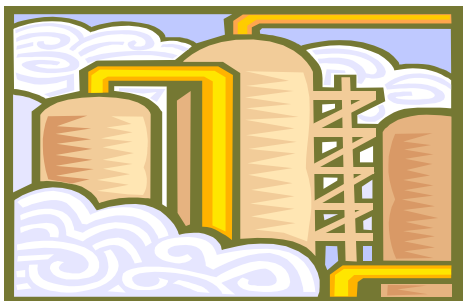
■ **Company managers**

- **Energy bills, consumption/tonne, where to save**



- **Even truer for energy companies**

- **Refinery: throughputs, stocks**
- **Electricity generation: fuel input, electricity production**

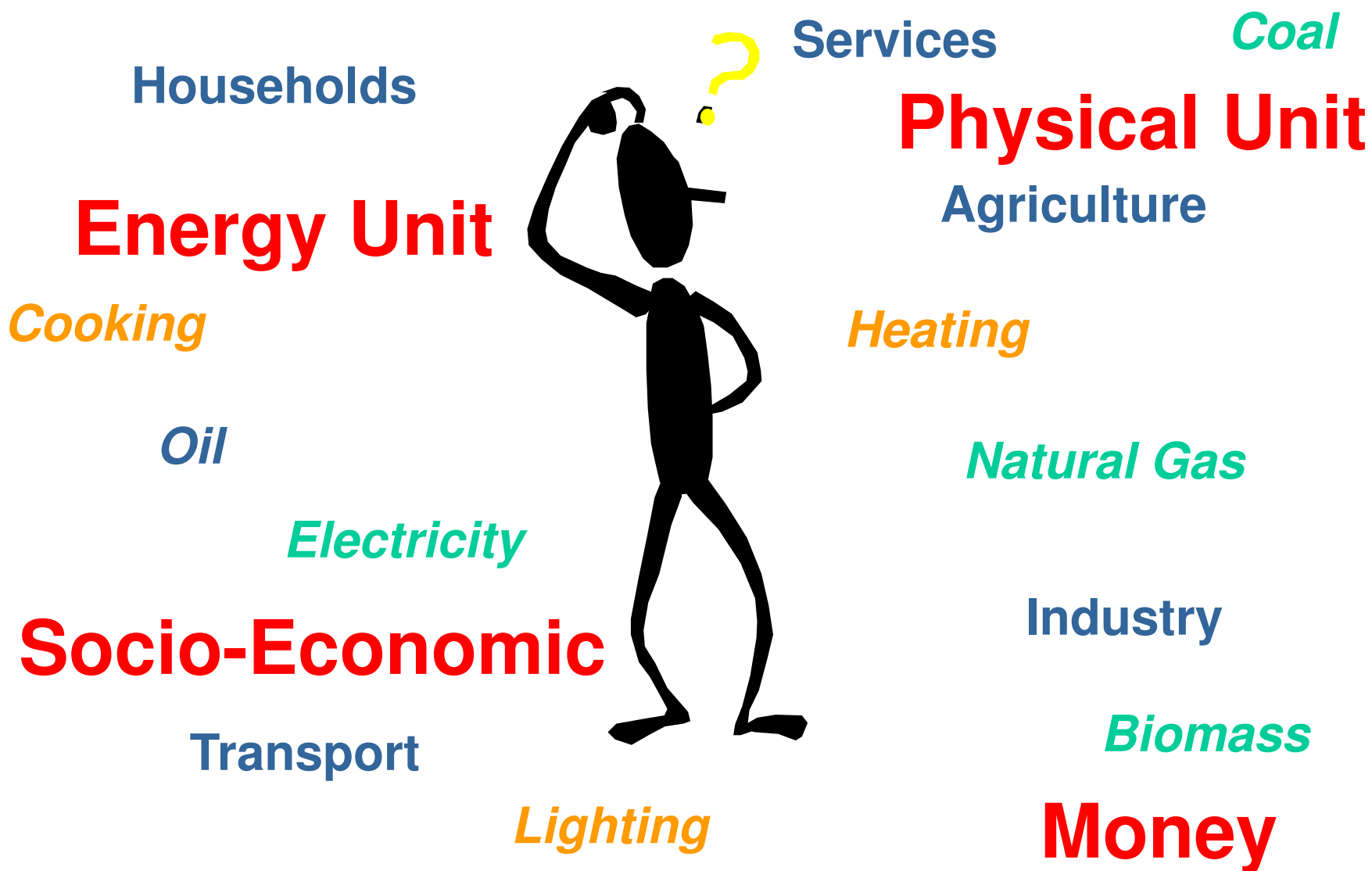


A few examples:

- **Households: mileage of cars, electricity consumption of houses, heating bills, etc.**
- **Company managers**
 - Energy bills, consumption/tonne, where to save
 - Even truer for energy companies
 - Refinery: throughputs, stocks
 - Electricity generation: fuel input, electricity production
- **Analysts of the energy market: oil, gas, etc.**
- **Traders, banks, universities, etc.**
- **Policy makers**

- **IEA Member countries** have an obligation to hold 90 days of stocks (net imports/consumption)
 - Need reliable and timely data on imports, consumption and stocks
- **OPEC Member countries:** production vs quota
 - Need reliable and timely data on production
- **EU Member countries:** obligation to have a minimum share of electricity consumption coming from renewables (21% by 2010)
 - Need reliable data on renewables
- **Annex 1 countries to the Conference of Parties:** respect of the engagement they have ratified when signing the Kyoto Protocol (70% to 80% of GHG come from fuel combustion)
 - Need reliable data on both supply and demand

What statistics to collect?



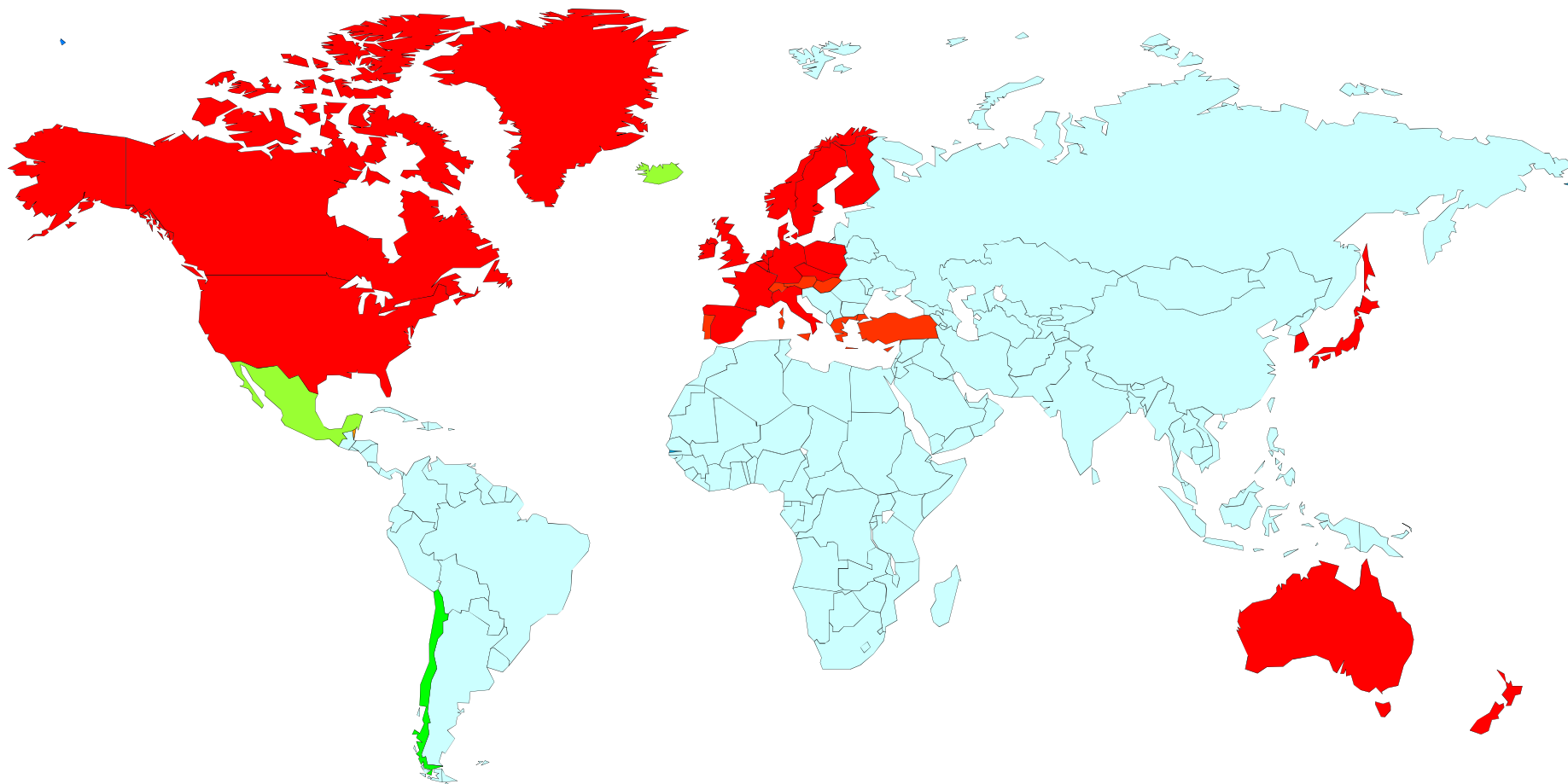
What statistics to collect?

- **Collecting any statistics has a cost**
- **However not having proper information could lead to higher costs**
- **So, limit the collecting to what is necessary**
- **What is necessary depends on your needs**



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A Growing Statistics Need for the IEA



Member countries

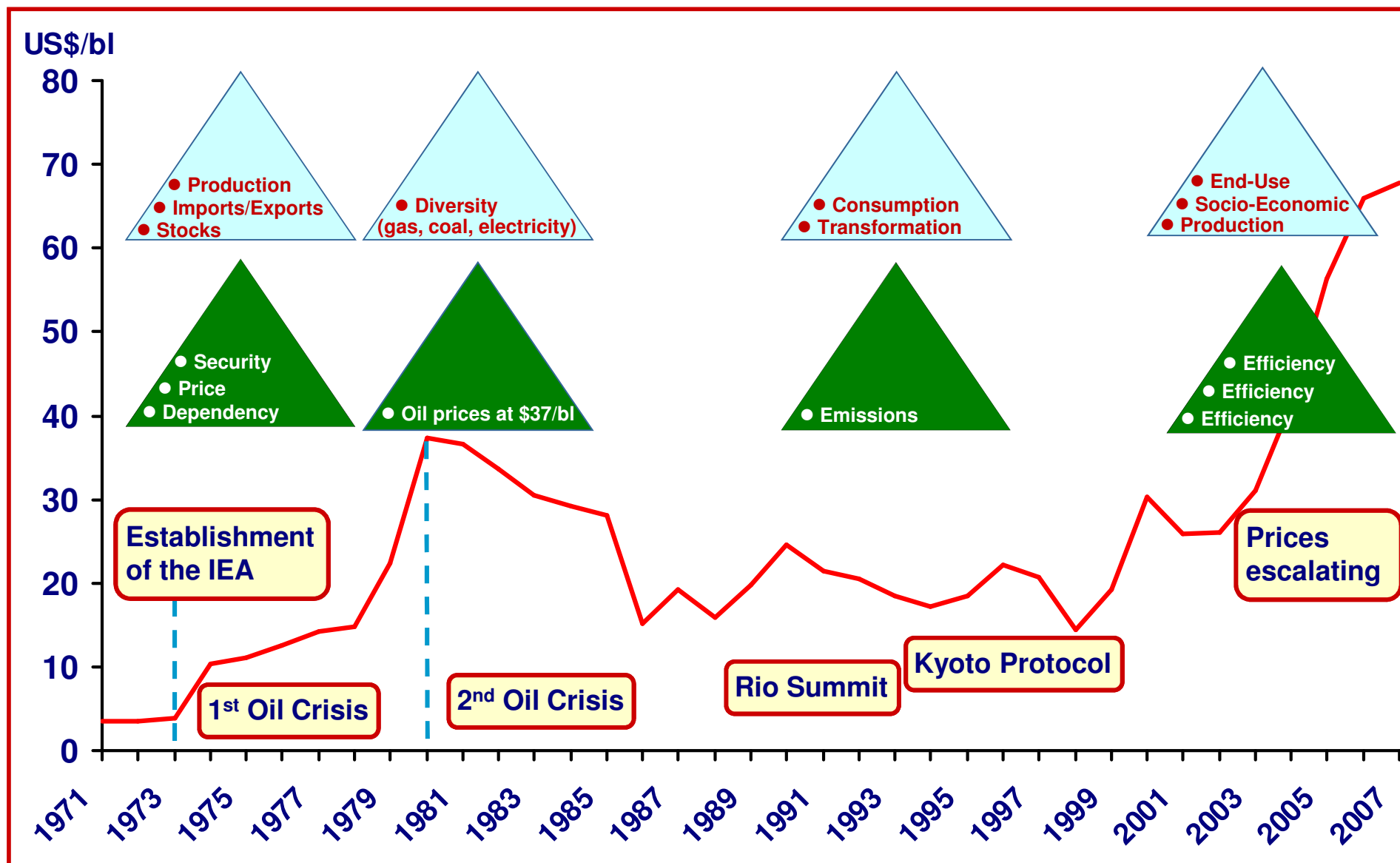
 IEA
 OECD

- Autonomous Agency of the OECD
- Established in 1974 after 1st Oil Crisis
- 28 Members Countries (vs. 31+ for OECD)
- 3 Es: Energy security, Economy and Environment



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How IEA Statistics developed over time



A few Basic Principles for Establishing an Energy Information System

- 👉 Do not collect statistics for the sake of collecting statistics but collect only statistics which are needed
- 👉 Establish a legal basis
- 👉 Establish a proper reporting mechanism:
 - ➡ Questionnaires (as user friendly as possible)
 - ➡ A network of focal points
 - ➡ An agreed timetable
- 👉 Allocate proper resources to collect/process the data
- 👉 Establish proper dissemination mechanism
- 👉 Do not lock the system. Keep the system live in order to anticipate the evolution of the energy situation



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Establish a Legal Basis

AGREEMENT
ON AN
INTERNATIONAL ENERGY PROGRAM
(As amended to 7th August 1992)

ACCORD
RELATIF A
UN PROGRAMME INTERNATIONAL
DE L'ENERGIE
(Tel qu'amendé jusqu'au 7 août 1992)

ÜBEREINKOMMEN
ÜBER EIN
INTERNATIONALES ENERGIEPROGRAMM
(In der Fassung vom 7. August 1992)

Decisions of Governing Board



Decisions of Specific Committees (Emergency preparedness, etc.)

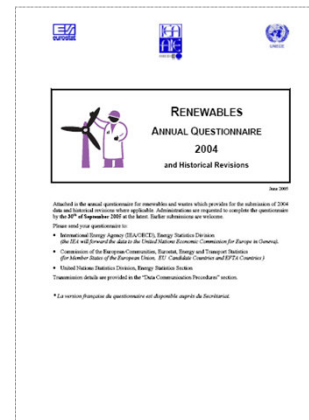
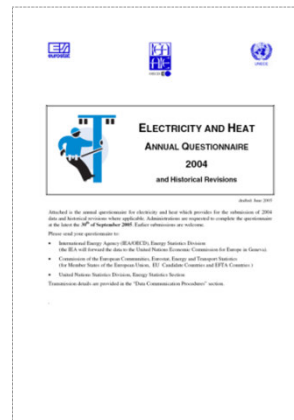
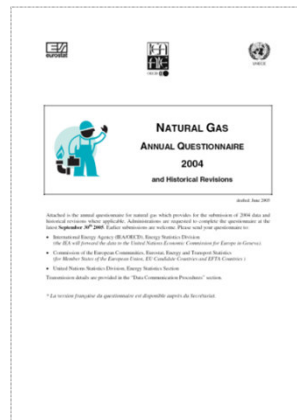
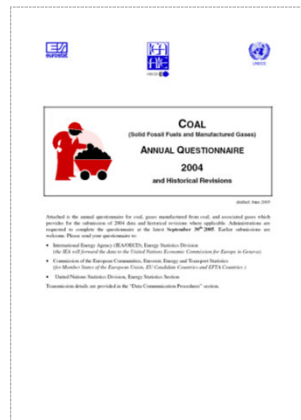


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Establish a proper reporting mechanism (OECD)



Five Annual Energy Questionnaires



Other Annual: Energy Forecast and R&D Budget for IEA



Quarterly Questionnaires: Prices and Taxes questionnaire



Monthly Questionnaires:

**Monthly Oil and Gas Statistics, Joint Oil Data Initiative
Electricity production and trade**



**Exceptional Questionnaires: Mainly in case of oil crisis,
or ad-hoc activities (e.g.: Non-Energy Use Network)**

What flows are collected?

Production
Import
Export
International Marine Bunkers
Stock Changes
Domestic Supply

Transfers
Statistical Differences

Transformation Sector (*18 sub-sectors*)
Energy Sector (*16 sub-sectors*)
Distribution Losses

Final Consumption
 Industry Sector (*13 sub-sectors*)
 Transport (*7 sub-sectors*)
 Other Sectors (*4 sub-sectors*)
 Non Energy Uses

Electricity and Heat Outputs



TOTAL: 95 FLOWS

What products are collected?

- Coal (17 products/categories)
- Natural gas
- Crude Oil and Petroleum products (25 products)
- Nuclear Energy
- Hydro Energy
- Renewable Energy (19 products/categories)
- Waste Energy (3 products/categories)
- Electricity
- Heat (7 categories)
- TOTAL: over 75 products/categories

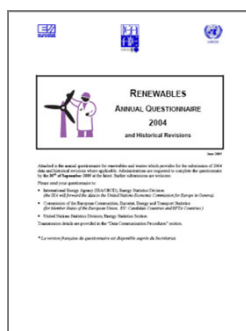


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An agreed timetable



Prepared in
June-July

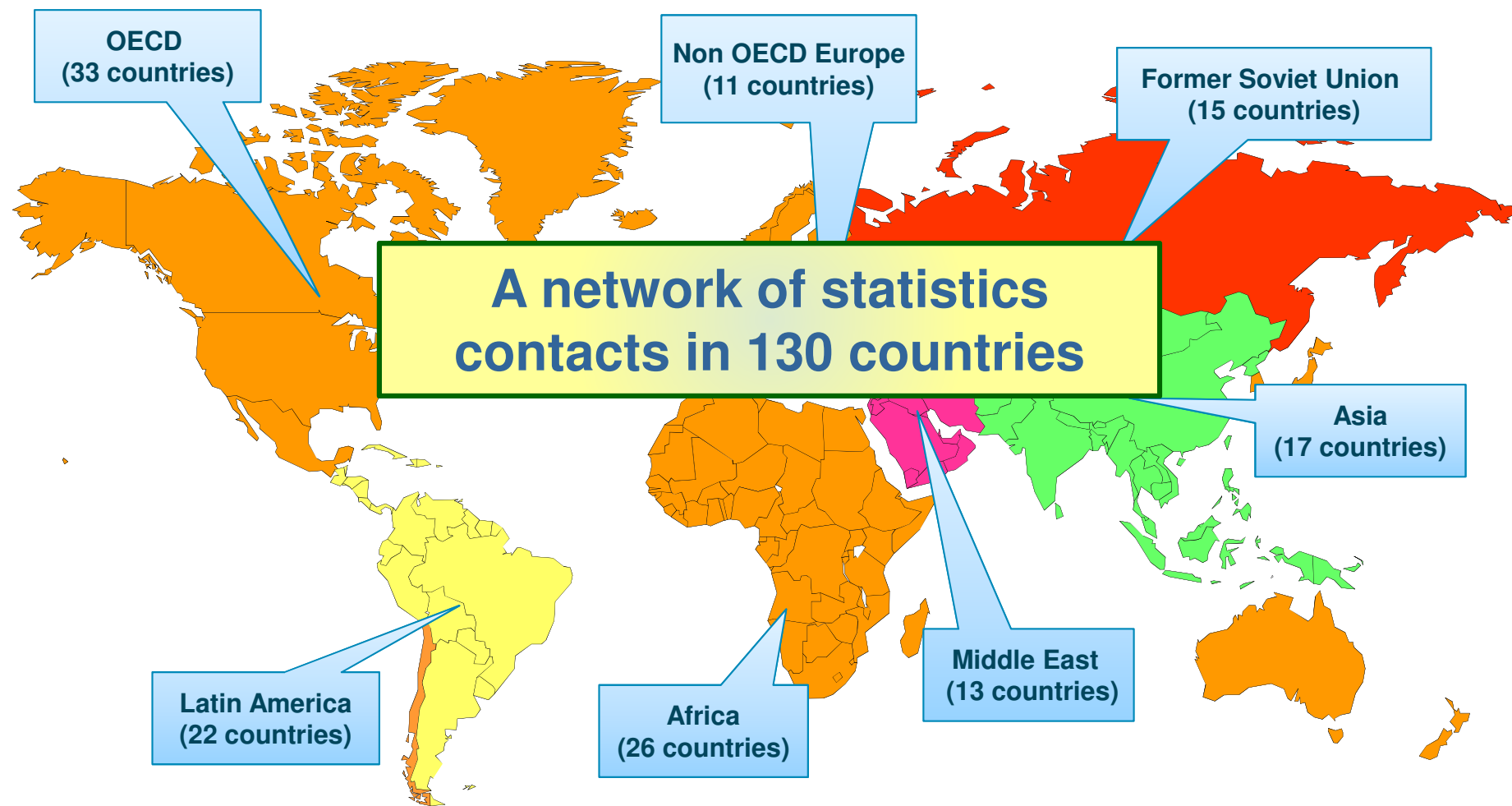


**National
Administrations**



Queries

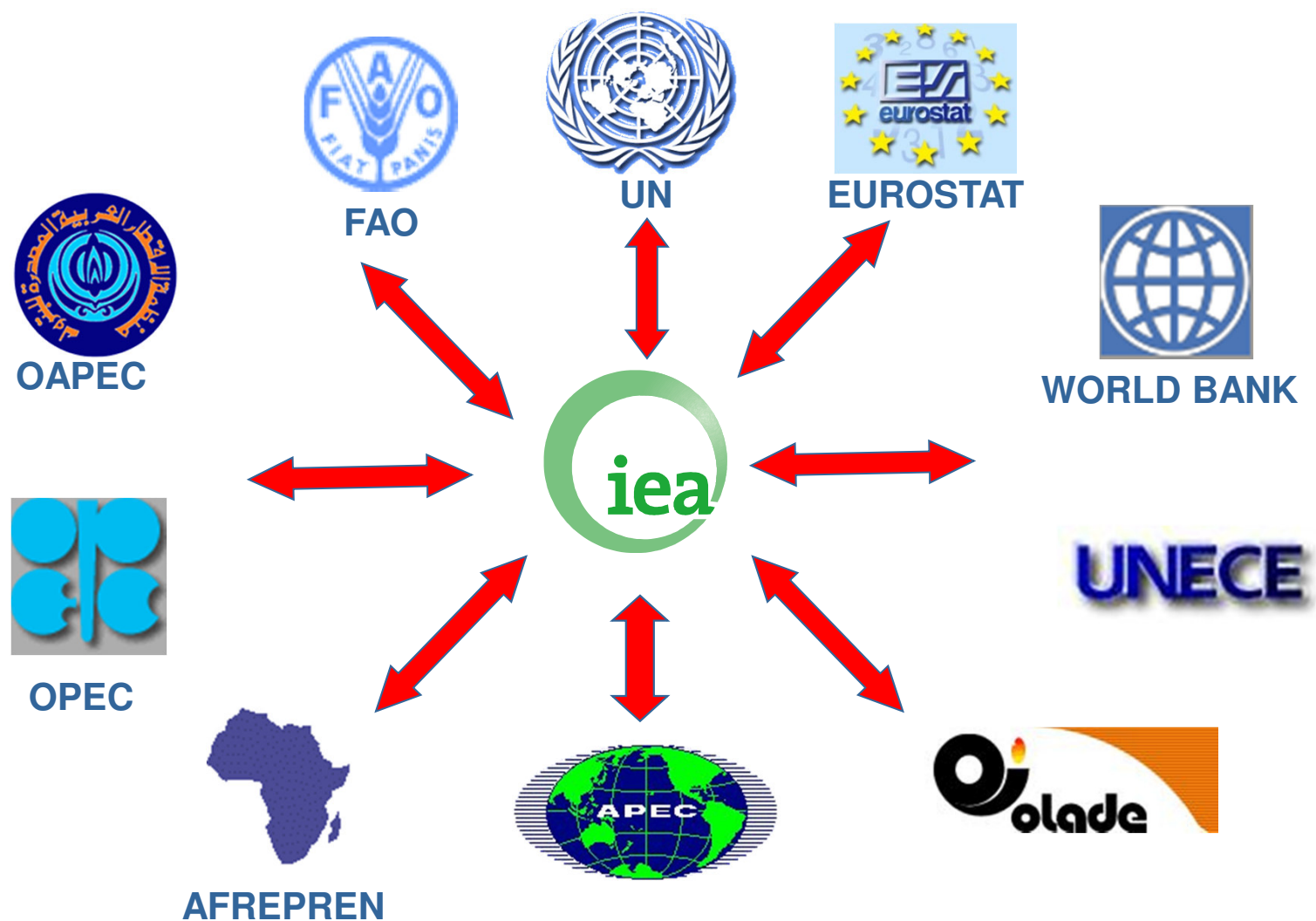
How non-OECD are collected





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










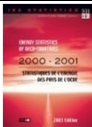





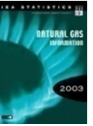



How non-OECD data are collected (cont.)





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The annual IEA statistics cycle

	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June	July	Aug	Sep
Questionnaires														
Processing														
Databases														
Publications and CD-ROMS														
														
														

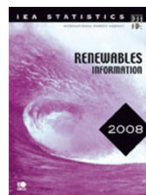
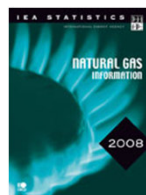
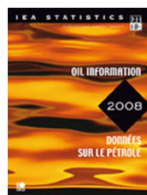


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Establish a proper dissemination mechanism



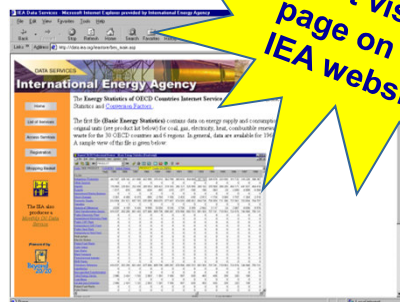
Books



CDs



Internet



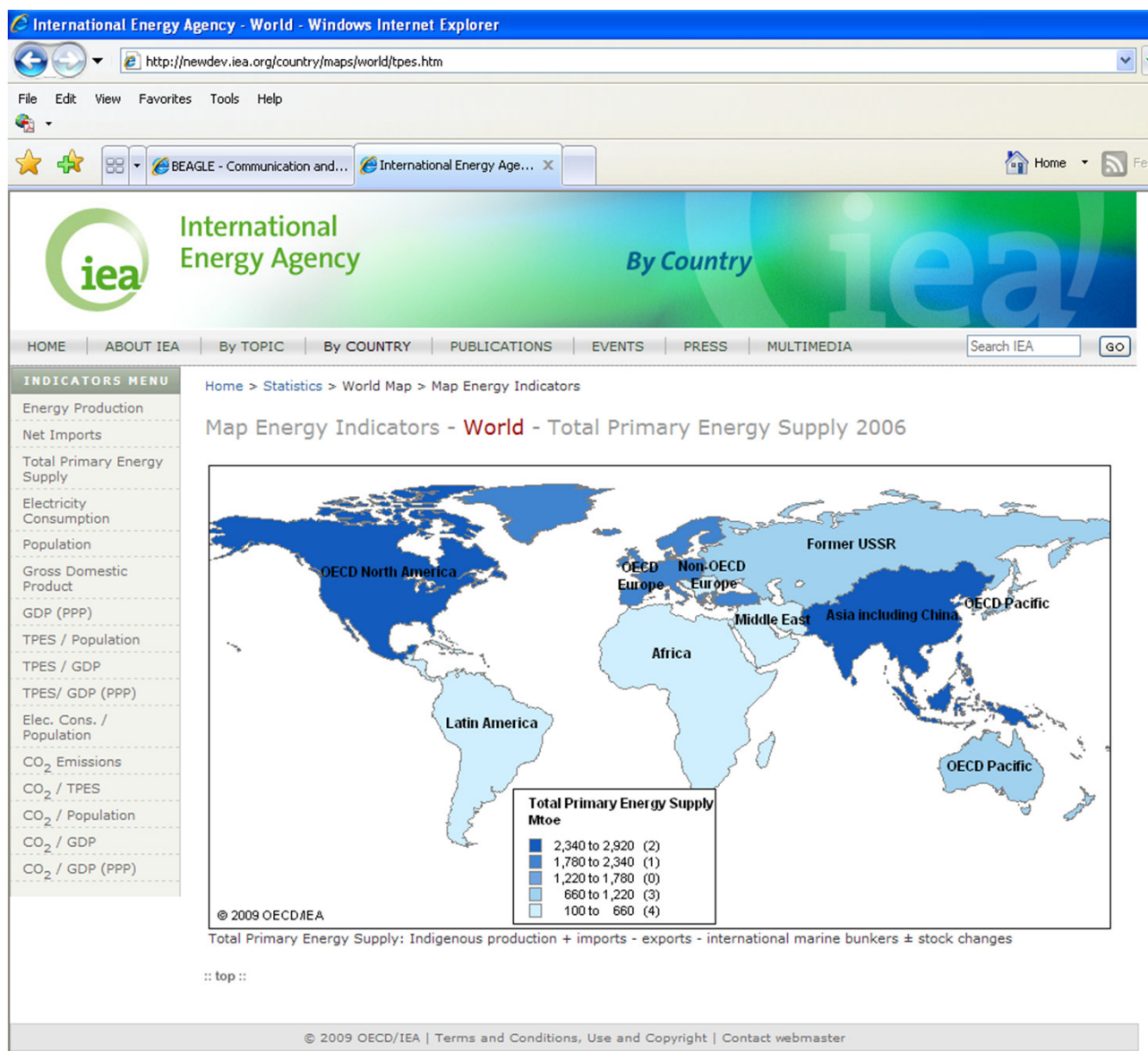
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- Pay-per-view also available



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Samples of free information available on the web





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IEA Energy Statistics Homepage - Windows Internet Explorer

http://www.iea.org/Textbase/stats/index.asp

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Statistics by Country/Region

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Publications for Sale

- [Electricity Information 2008 with 2007 data](#)
- [Energy Balances of OECD Countries 2008 Edition](#)



Statistics by Product

- Balances
- Indicators
- Coal
- Electricity/Heat
- Oil
- Natural Gas
- Renewables

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- [Graphs](#)
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- [Oil pdf, excel](#) (view archive since 1999)
- [Natural Gas pdf, excel](#) (view archive since 1999)

http://www.iea.org/Textbase/stats/defs/defs.htm

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Organisation of the International Energy Agency



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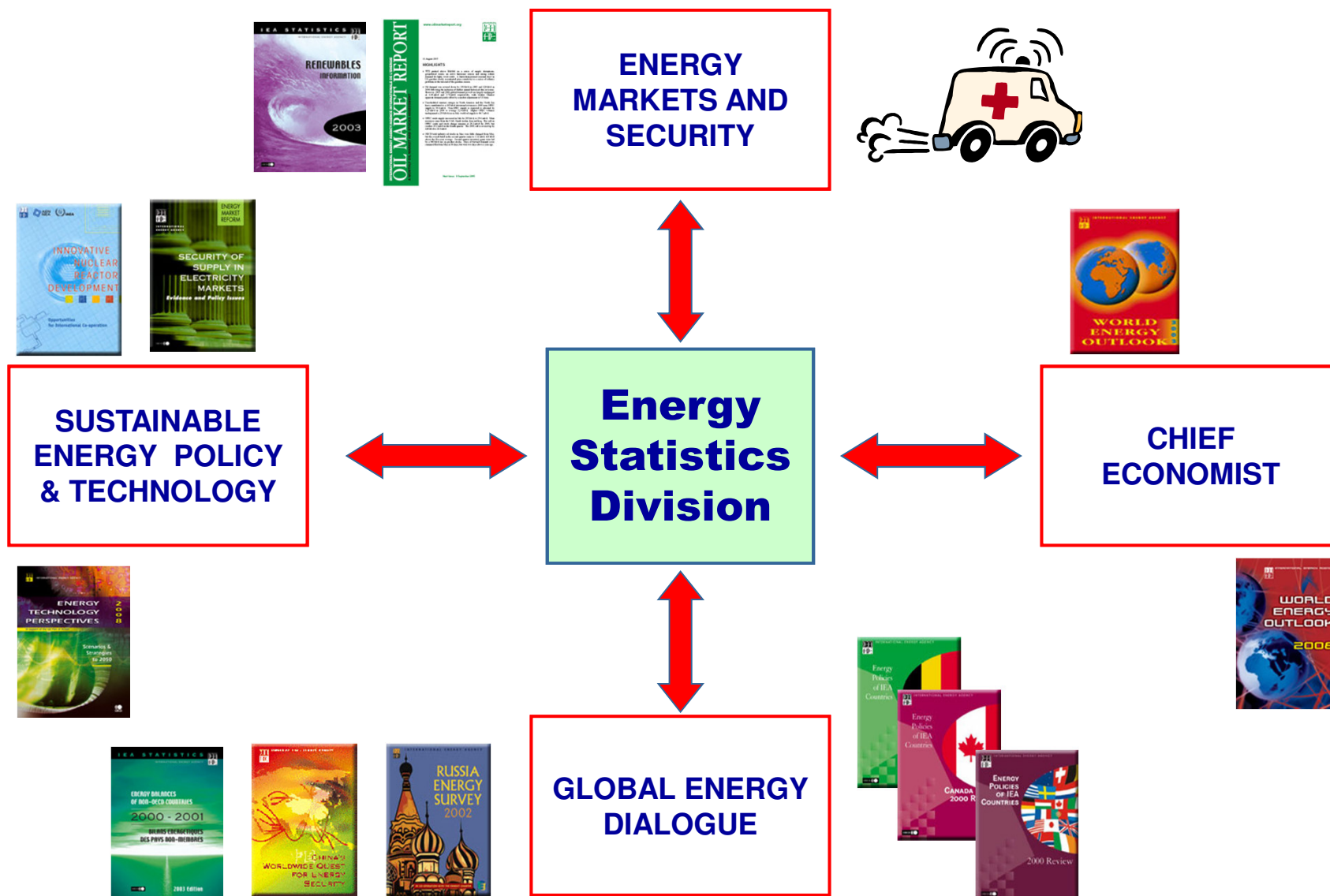
Energy
Technology
Policy



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Energy Statistics Division

The "Heart" of the Agency



The IEA Energy Statistics Division

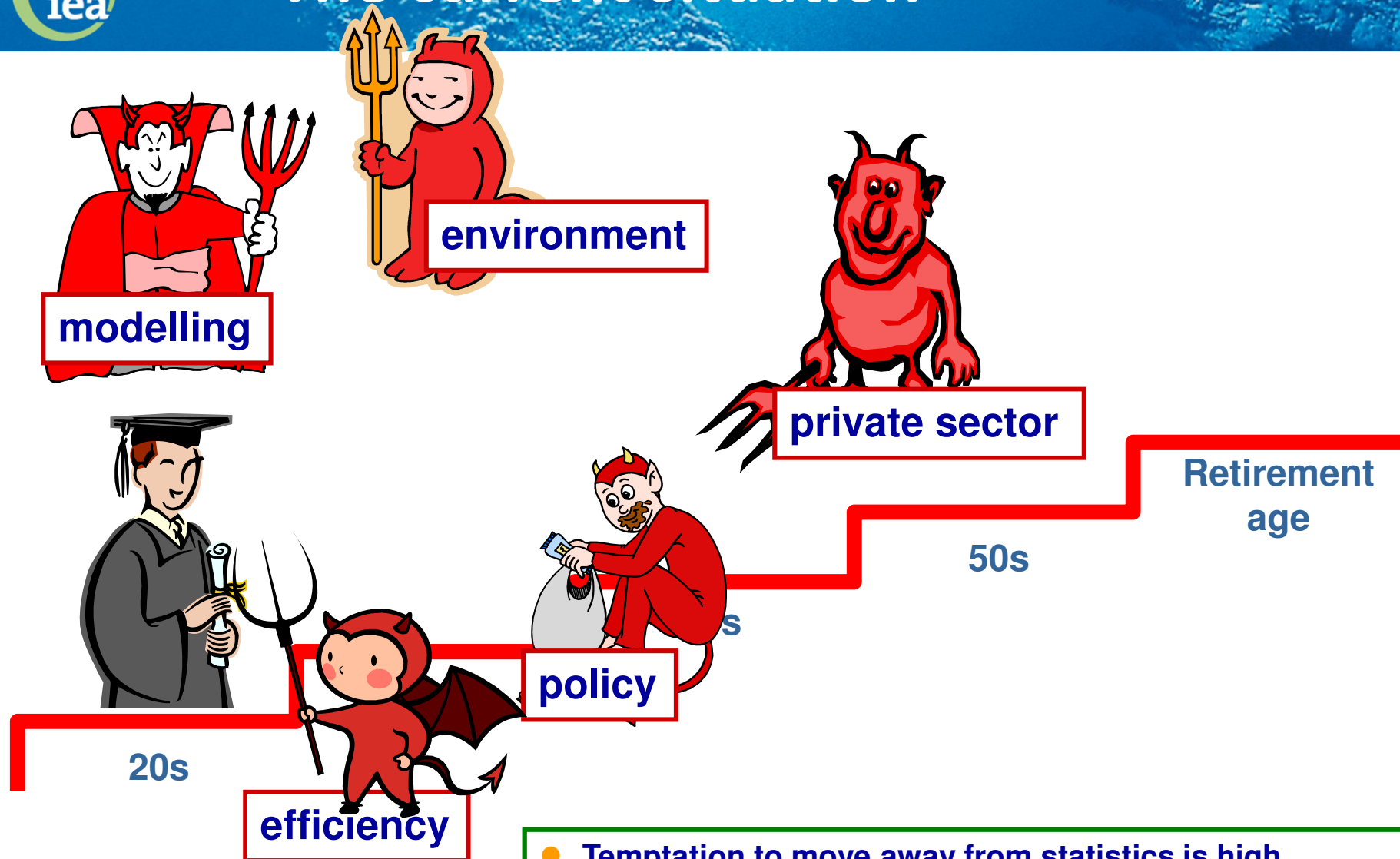
ESD employs 30 persons including 22 statisticians allocated by data frequency and activity as follows:

Monthly Data	26%	Oil	26%
Quarterly Data	11%	Balances and emissions	16%
Annual Data	42%	Prices	11%
Non-member countries	21%	Coal	8%
		Electricity and Heat	8%
		Gas	5%
		Renewables	5%
		Non-member countries	21%

- 👉 Liberalisation of the market:
From one company to hundreds
- 👉 Confidentiality (linked to liberalisation)
- 👉 More work passed to statistics offices:
 - More companies to survey (liberalisation)
 - Renewables (remote information)
 - Energy efficiency indicators (including socio-economic data)
 - Environment (estimation of GHG emissions,)
 - Etc.
- 👉 Resources do not follow work load:
Statistics still have a low profile, budget cuts
- 👉 Fast turnover in staff experience, continuity



The current situation



- Temptation to move away from statistics is high
- Young statisticians only stay a few years
- Not enough time to have a full grasp of energy statistics
- No time to transmit their expertise



Facilitating the work of newcomers in statistics:

- Energy Statistics Manual
- User-friendly electronic questionnaires
- Training



Raising the profile of energy statistics and the role of statisticians

- Ministerial meetings
- Governing Board Meetings



Harmonisation and Cooperation



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eurostat

Energy Statistics **MANUAL**



Facilitating the work of newcomers in statistics

**A user-friendly manual
to give necessary
information to
newcomers to
understand/complete
annual questionnaires**



1 What is Oil ?

General information

Petroleum is a complex mixture of liquid hydrocarbons, chemical compounds containing hydrogen and carbon, occurring naturally in underground reservoirs in sedimentary rock. Coming from the Latin *petra*, meaning rock, and *oleum*, meaning oil, the word “petroleum” is often interchanged with the word “oil”. Broadly defined, it includes both primary (unrefined) and secondary (refined) products.

General information and definitions related to the processes and activities mentioned within the questionnaire.

Oil is the largest traded commodity world wide, either through crude oil or through refined products. As a consequence, it is essential to get data as complete, accurate and timely as possible on all oil flows and products. Although oil supply continues

Specific information related to the joint questionnaire

The *Oil Questionnaire* covers oils processed in refineries and the petroleum products made from them. All sources of supply and the uses of the oils are included as well as their calorific values.

below.

A whole range of petroleum products are derived from crude oil, varying from light products such as LPG and motor gasoline to heavier ones such as fuel oil.

Backflows from the petrochemical industry are oils returned to the refinery from processes in the petrochemical industry. They are by-products of processing feedstock oil supplied to the petrochemical enterprises by the refinery. The refinery may use the backflows as fuel or include them in finished products. Total backflows from petrochemical industry reported in Table 1 should be identical to backflows reported in Table 2B.

Products transferred are oils which are reclassified under another name. There is a corresponding row in Table 2A in which the amounts to be transferred are reported. The need for reclassification arises when semi-finished products are imported for use as feedstock in the refinery and therefore appear in the import data shown in Table 2A. The amounts to be used as feedstock are shown as negative quantities in the 'products transferred' row in Table 2A and the total of all products transferred is then reported as a positive quantity in the refinery feedstock column of Table 1.

Refinery losses are mass differences which appear between the total oil throughput of the refinery (reported as "refinery intake observed" in Table 1) and the total gross production of finished products (reported in Table 2A). The losses arise through genuine oil losses and the conversion of refinery statistics used within the refineries to mass units.

Direct use is amounts which do not enter the refinery but enter consumption directly. The "direct use" of crude oil and/or NGL outside of refineries must also be reported

Essential

Indigenous production concerns marketable production within national boundaries including off-shore production.

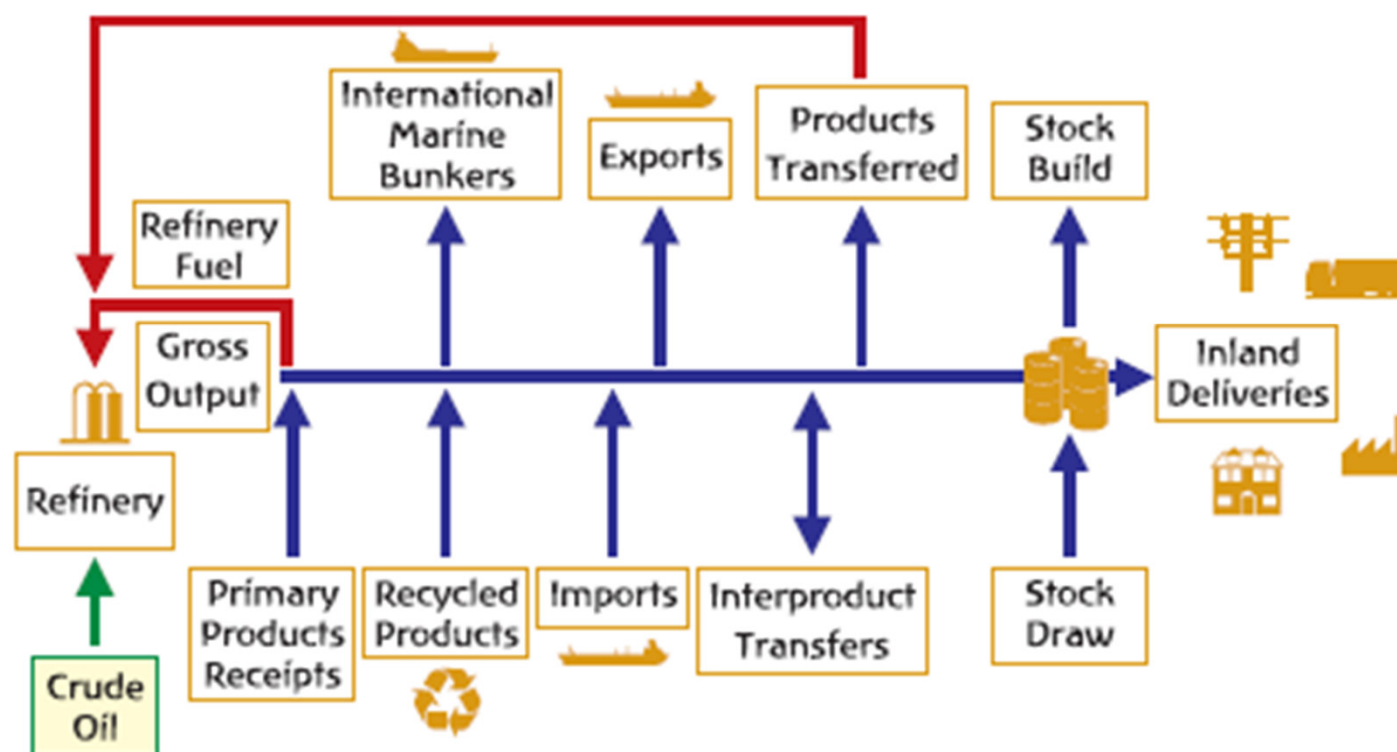
Refinery intake is the total amount of oil to have entered the refinery process.

General information

A simplified flowchart of the supply chain from the refinery to the end-user is shown below.

Crude oil as it comes out of the ground is a raw material with limited use. Although it can be used as a burning fuel, the real potential of crude oil is reached when it is refined into a range of products, which will be useful for specific purposes of the final consumer (e.g. gasoline for transportation). The objective of refining is to add value to the raw material, as the total of the refined products should be more valuable than the feedstock.

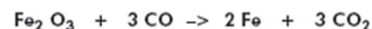
Figure X • Supply of Finished Products



production to obtain the gross production figure. The more common problem, however, is that production figures are given but no refinery fuel figures are available. In this case it is most likely that the production figures are net. The statistician should then check whether all usual petroleum products are reported and, if not, ask whether the missing products are being used as refinery fuel and seek estimates of the amounts concerned. An estimate of the magnitude of missing products and/or refinery fuel may be made by comparing refinery intake observed on Table 1 with total production as reported.

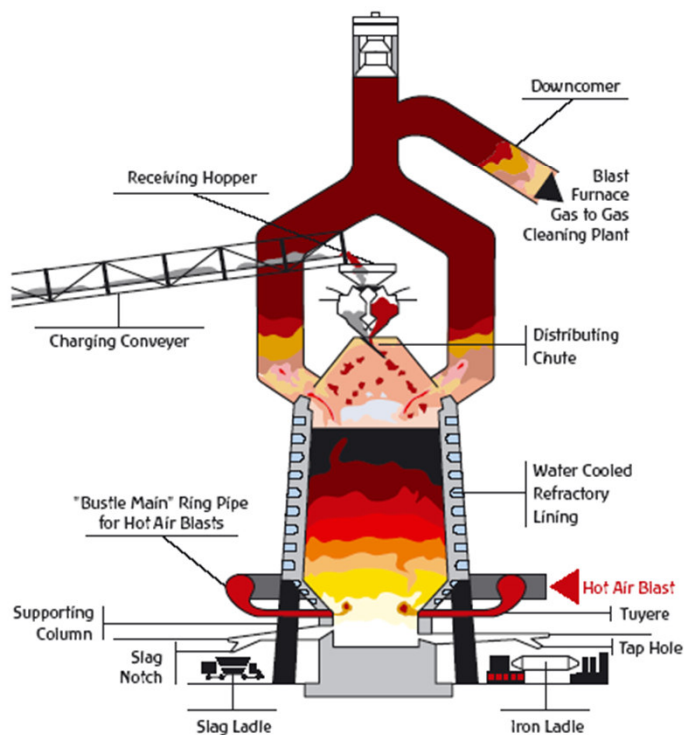
A Annex 1

The essential chemistry of the process is the reduction of iron ore (iron oxide) with carbon obtained from the coke:

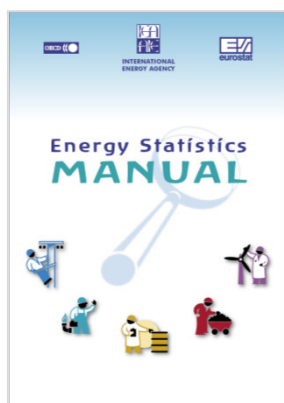


Not all of the carbon monoxide (CO) is converted to carbon dioxide (CO₂) in the process and the excess passes out of the blast furnace into the blast-furnace gas. The presence of carbon monoxide in the blast-furnace gas gives it (as produced) a heating value. The temperature of the blast air as it enters the furnace may be as high as 900°C and provides most of the heat requirement. Partial combustion of the fuels in the furnace and, where it occurs, of the fuels injected into the blast air provides the remaining heat. The blast-furnace gas is cleaned and may be enriched with coke-oven gas before use to heat the blast air and for other purposes on the manufacturing site. The blast air heaters (cowpers) are separate from the blast furnaces and not shown in Figure A1.8.

Figure A1.8 • Key Features of a Blast Furnace



The joint IEA/OECD/Eurostat manual is now available in 8 languages and soon in 9



English



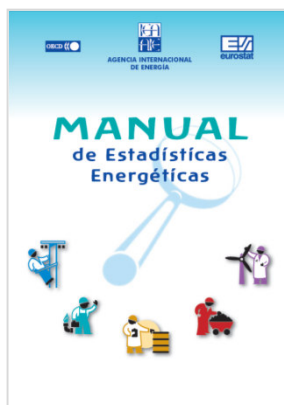
French



German



Turkish



Spanish



Russian



Chinese



Indonesian

An Arabic version is under preparation



Facilitating the work of newcomers in statistics:

- **Energy Statistics Manual**
- **User-friendly electronic questionnaires**
- **Training**



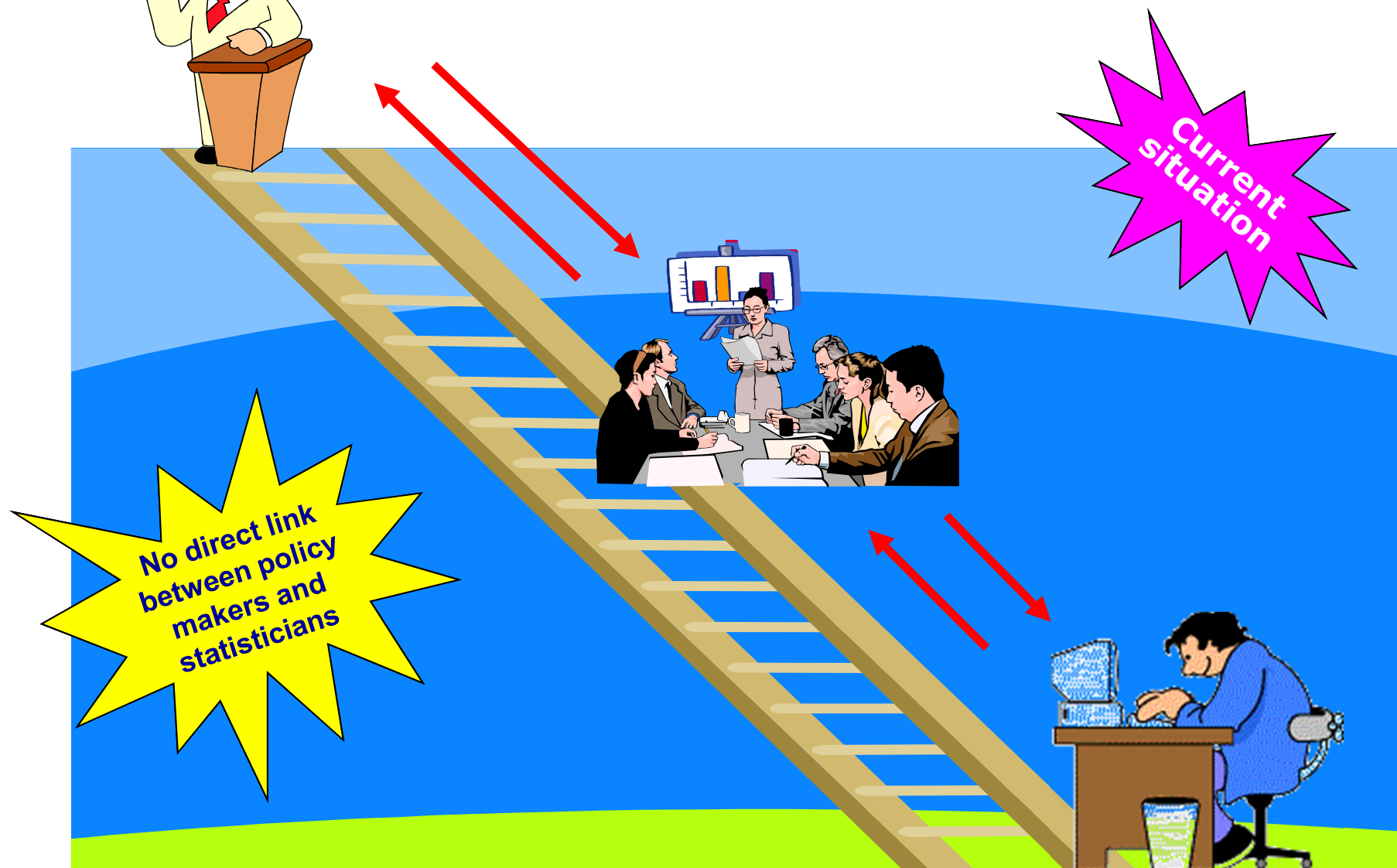
Raising the profile of energy statistics and the role of statisticians

- **Ministerial meetings**
- **Governing Board Meetings**

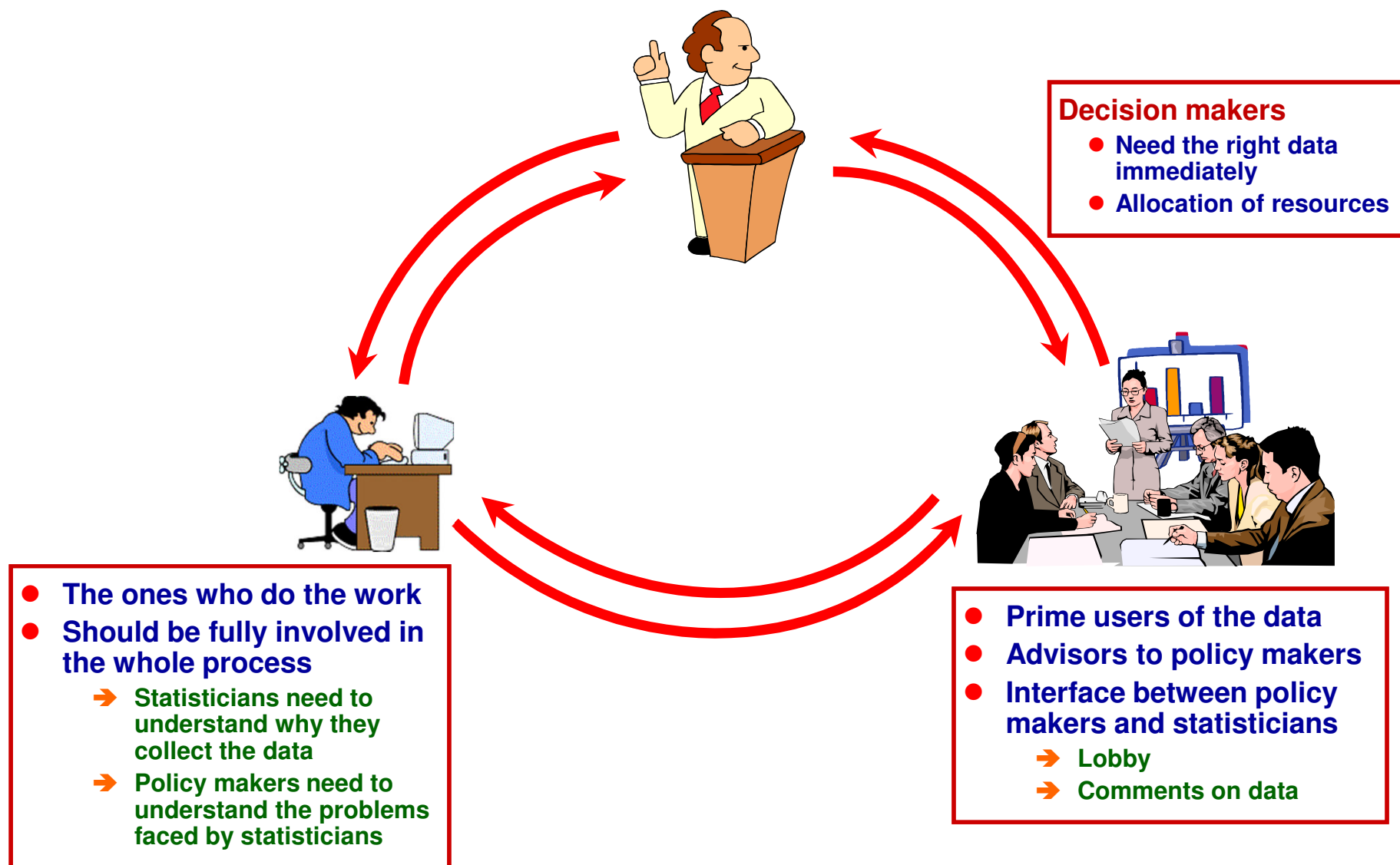


Harmonisation and Cooperation

Raising the profile of statistics and the role of statisticians



In fact, the relationship between policy makers, analysts and statisticians should be more based on a 3-way street





Raising
the profile

On 19 November 2005, an example of how the profile of statistics can be raised is the launch of the JODI Database by King Abdullah

How the IEA tackles these problems



Facilitating the work of newcomers in statistics:

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Raising the profile of energy statistics and the role of statisticians

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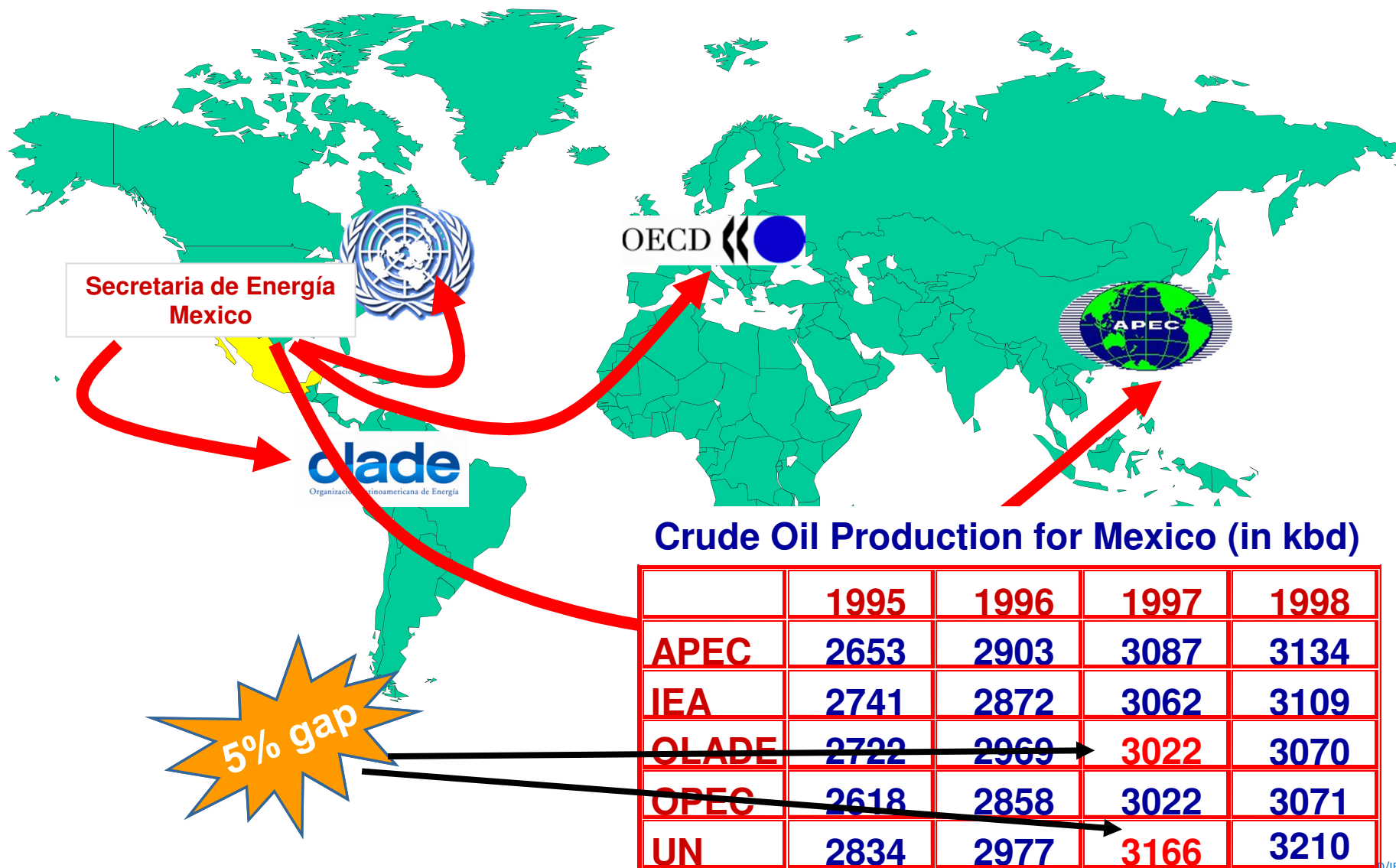


Harmonisation and Cooperation



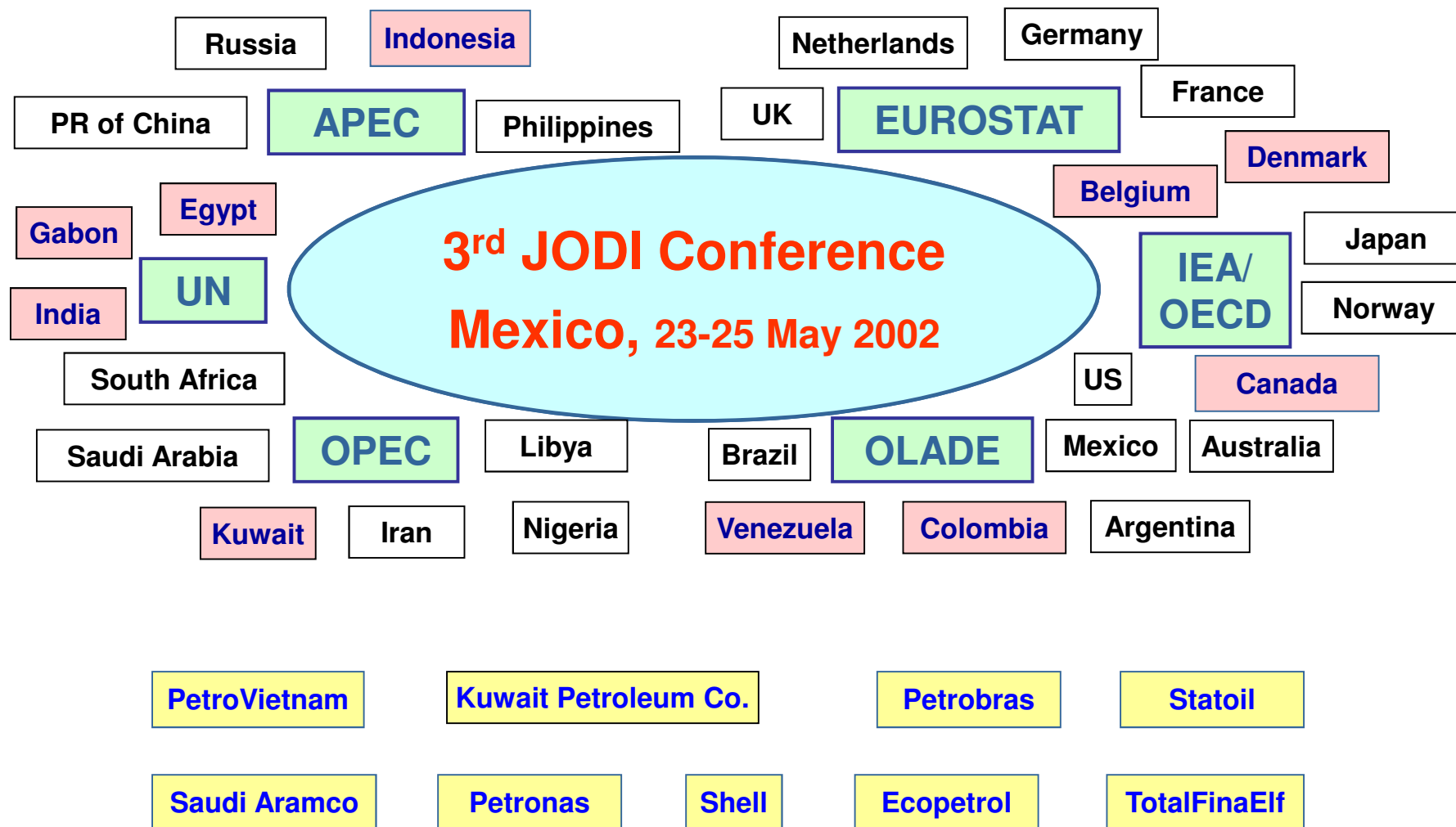
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Harmonisation and Cooperation





JODI: Cooperation between countries, organisations and companies



The JODI database is open to all and updated every month

Beyond 20/20 WDS - Table View - Microsoft Internet Explorer

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Actions

OTHER:

Unit - Thousand Barrels (kbbbl)

Product - Total Products

Balance - Demand

TIME	Jul2004	Aug2004	Sep2004	Oct2004	Nov2004	Dec2004	Jan2005	Feb2005	Mar2005	Apr2005	May2005	Jun2005	Jul2005	Aug2005
Country	↑↓	↑↓	↑↓	↑↓	↑↓	↑↓	↑↓	↑↓	↑↓	↑↓	↑↓	↑↓	↑↓	↑↓
Hong Kong China	9,978	9,737	9,818	8,795	10,067	10,087	10,810	8,426	8,513	8,279	9,435	8,322	8,320	8,917
Hungary	3,902	4,018	4,047	4,388	4,316	4,482	3,750	3,518	4,105	4,120	4,526	4,279	4,627	4,120
Iceland	645	1,118	533	510	630	105	653	345	615	263	548	518	698	0
India	71,116	61,773	67,294	70,736	68,626	78,457	71,314	67,096	77,376	65,649	70,127	68,086	64,537	67,088
Indonesia	38,037	36,270	0	37,603	36,810	0	37,820	0	35,650	36,360	37,696	34,290	31,093	0
Iran (Islamic Rep.)	33,294	37,262	35,340	35,340	35,700	37,603	38,068	36,960	43,338	35,310	36,828	0	40,424	41,819
Iraq	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ireland	4,762	4,790	5,191	5,473	4,881	5,670	5,121	5,339	5,945	4,952	4,938	5,530	4,649	5,241
Italy	59,715	52,889	57,379	58,602	54,046	58,187	52,416	51,878	56,586	52,613	51,936	52,205	55,036	51,041
Jamaica	1,188	1,123	995	1,170	1,204	124	1,145	1,145	0	0	0	0	0	0
Japan	160,497	166,360	151,021	161,008	158,607	187,922	183,288	177,169	189,948	157,929	144,998	154,802	157,841	158,375
Kazakhstan	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Korea	61,557	65,631	64,743	69,214	69,713	78,656	78,321	67,656	78,360	67,477	63,426	64,135	61,557	65,600
Kuwait													11,377	12,183
Latvia													1,134	1,212
Libya													0	0
Lithuania													1,814	1,986

The database is now used by analysts, oil companies, traders, governments world wide.

Done Local intranet

InterEnerStat

Strengthening Harmonisation and Cooperation

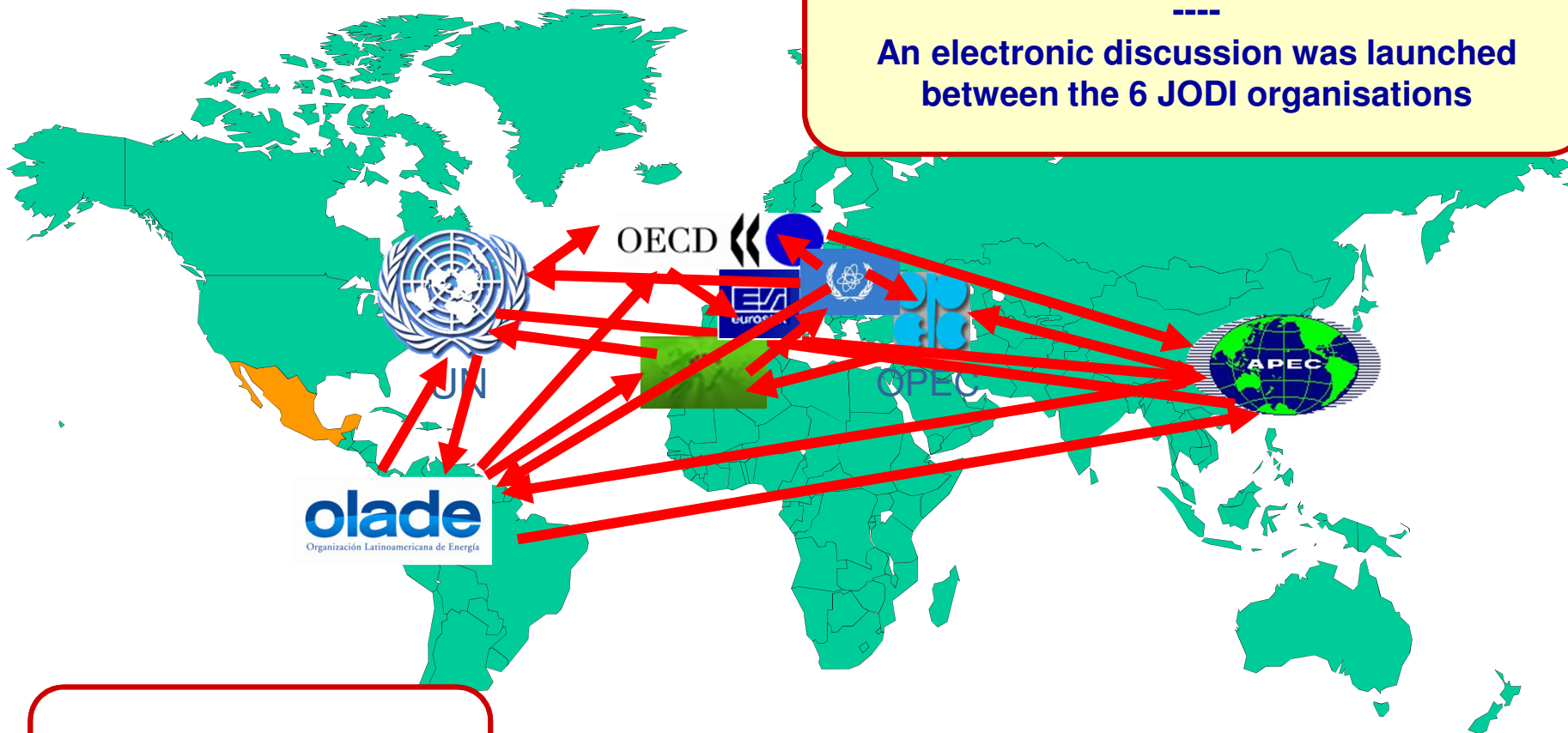
2nd InterEnerStat Workshop, 19-20 November 2007, IEA, Paris



Harmonising definitions seem easy...

The example of crude oil production

An electronic discussion was launched
between the 6 JODI organisations



Hundreds of e-mails and
no real agreement on a
harmonised definition...

... in fact, it is not!



International
Energy Agency

Close to an agreement on harmonised definitions

InterEnerStat

Harmonisation of Definitions
of Energy Products and Flows



SECOND REVISION OF THE DEFINITIONS

Part 1: Flows

IEA, Paris, 20 September 2009

InterEnerStat

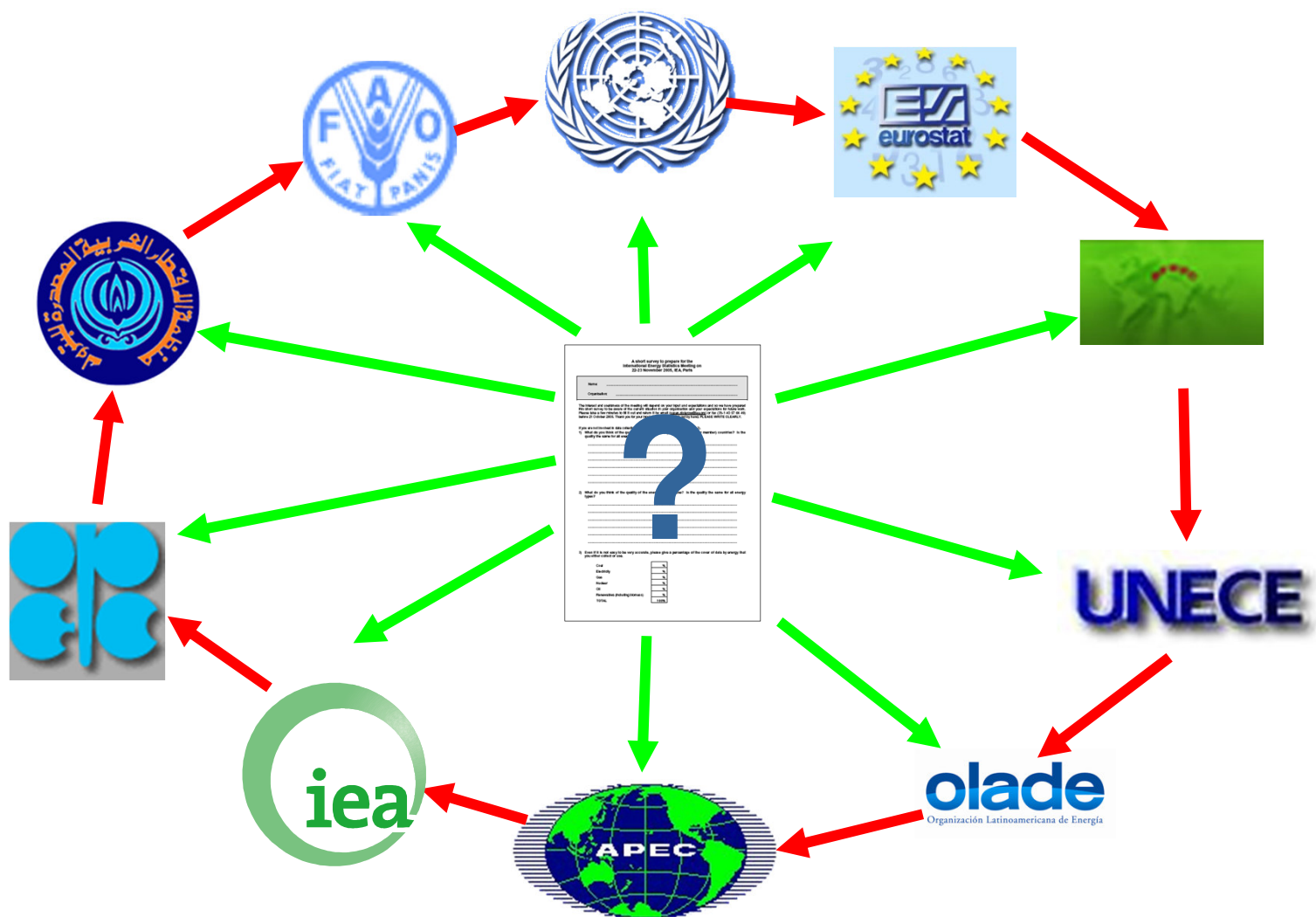
Harmonisation of Definitions
of Energy Products and Flows



SECOND REVISION OF THE DEFINITIONS

Part 2: Products

IEA, Paris, 20 September 2009



- There are constant changes in the energy sector

- New products

- ☐ Orimulsion
- ☐ Oil shale, tar sands
- ☐ LNG
- ☐ Ethanol

- New forms of energy

- ☐ Wind
- ☐ Photovoltaic
- ☐ Hydrogen

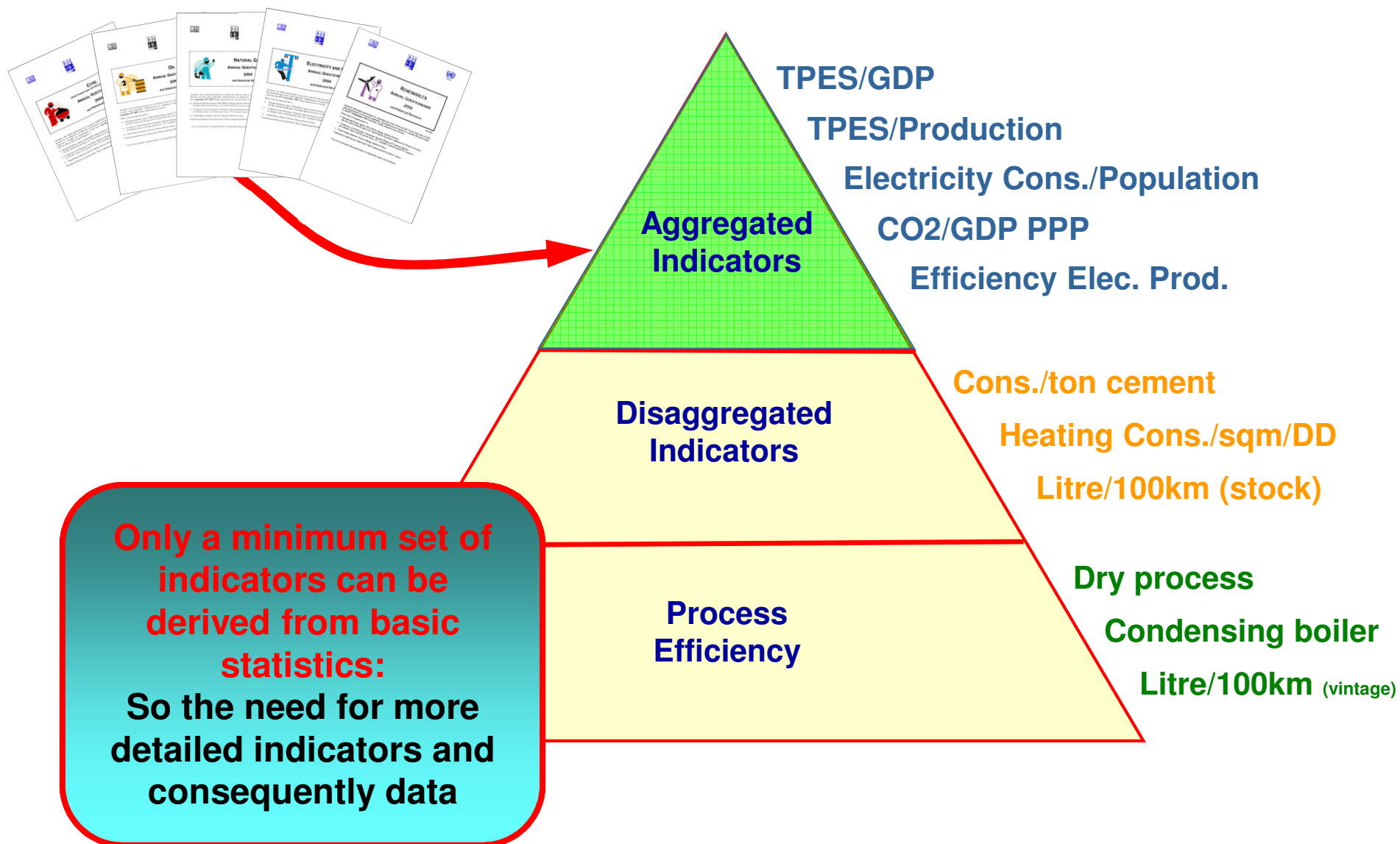
- New players

- ☐ Liberalisation
- ☐ Development of trade (oil, coal, gas, electricity)

- New Needs

- ☐ Kyoto protocol
- ☐ Energy efficiency

The Indicator Pyramid





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A NEW QUESTIONNAIRE ON ENERGY EFFICIENCY



Draft Energy Efficiency Indicators Template country name

COUNTRY DATA SECTION (to be reviewed and updated)

MACRO ECONOMIC DATA	Macro economic and activity data
COMMODITIES	Production outputs from selected energy-consuming industries
INDUSTRY	Energy consumption by ISIC categories
SERVICES	Energy consumption by end-uses in the services sector
RESIDENTIAL	Household energy consumption by end-uses and selected appliances data
TRANSPORT	Energy and activity data for passenger and freight transport

IEA DATA and AGGREGATE INDICATORS

ELECTRICITY GENERATION	Electricity generation from combustible fuels and efficiencies
BASIC INDICATORS	Predetermined set of aggregate energy and activity indicators

SUPPORT TOOLS

USER REMARKS	To incorporate comments associated to the data from the individual sheets
DATA COVERAGE	Generates a graphical summary of data coverage (completed vs. expected)
SINGLE INDICATOR GRAPHS	To generate a graph for one energy indicator
MULTIPLE INDICATORS GRAPHS	To generate a graph comparing trends from multiple indicators
CONSISTENCY CHECKS	To run the integrated consistency checks

A Quick Overview of the Agenda

Monday 11

Opening session

**Why Collect Energy
Statistics?**

**State of Energy
Statistics in
South Africa:
Strengths and
weaknesses**

Coal

Tuesday 12

Gas

Oil
(Annual , Monthly)

Renewables

Electricity

Energy Balances

Wednesday 13

**Energy
Efficiency
Indicators**

CO2 Emissions

**Cooperation
between
South Africa
and the IEA**

Closing

A few words to conclude

- 👉 Energy statistics are the basis for any sound energy policy. As a consequence, it is essential to allocate proper resources to collect the necessary data for monitoring and planning
- 👉 You don't build reliable statistics overnight. It takes time, effort, regulation/law, resources, ...
- 👉 It took 30+ years for the IEA to establish its statistics and to become one of the world references and we are constantly expanding coverage and struggling for improving quality
- 👉 Harmonisation and cooperation are two key words to improve quality and coverage of energy statistics
- 👉 The IEA is extremely committed to strengthen cooperation with OECD member countries, with major non-OECD countries as well as with regional and international organisations
- 👉 This is the reason why we are delighted to be with you for the next three days in order for us to better understand strengths and weaknesses of energy statistics in South Africa and for sharing our own experience of international energy statistics.
- 👉 It is our sincere hope that this workshop will further strengthen the relationship between South Africa and the IEA.

Thank you