

Rosstat-Russia-IEA Training Week on Energy Statistics

Moscow, 14-17 February 2012

Introduction to Energy Statistics and to IEA Energy Statistics

Why and how to collect necessary energy statistics



Jean-Yves Garnier
Head, Energy Statistics Division

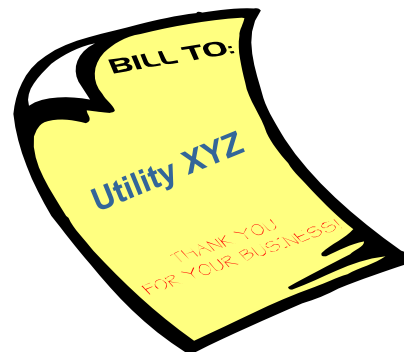
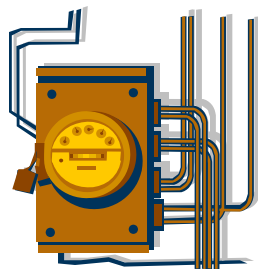
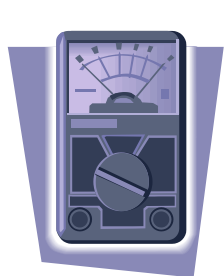


International
Energy Agency

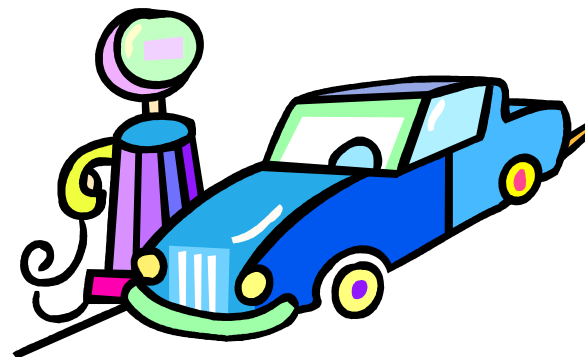
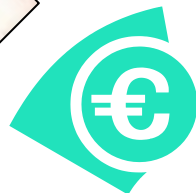
A few examples:

■ Households:

- electricity consumption of houses,
- heating bills,



- mileage of cars,

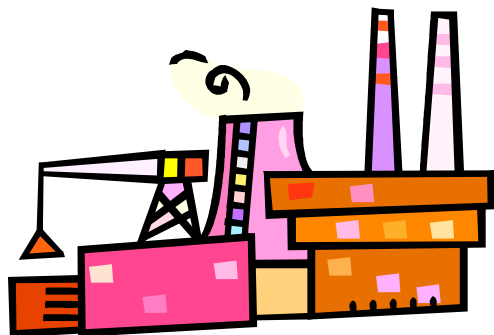


Any socio-economic category needs statistics to operate. This is also true for energy statistics

A few examples:

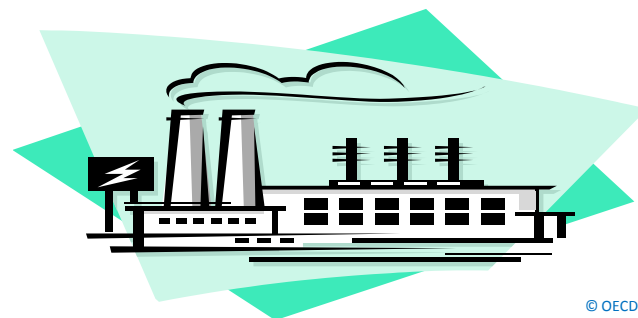
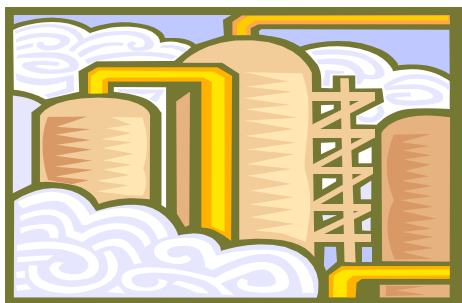
■ Company managers

- 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



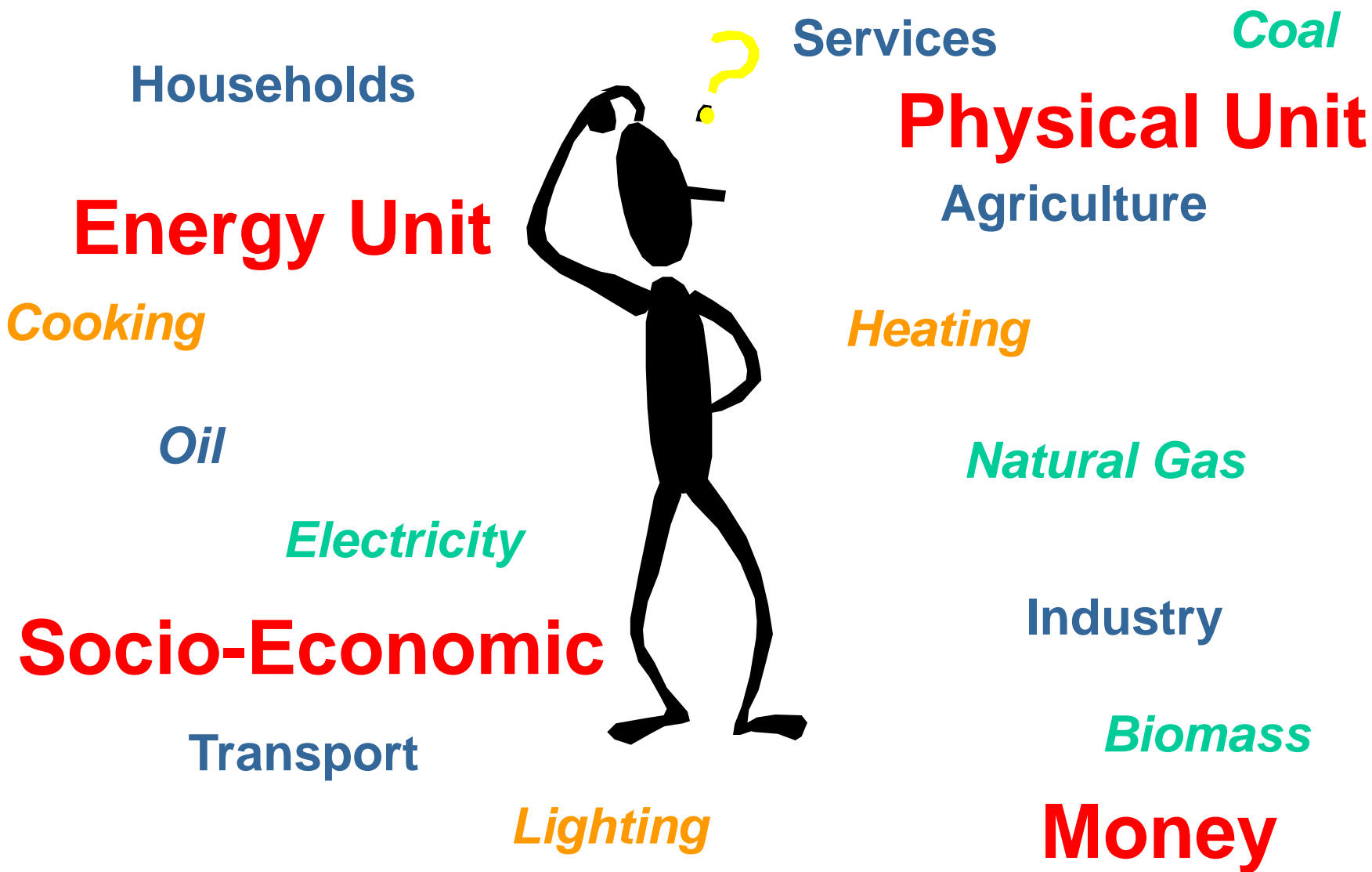
- Need reliable data on renewables

- ❑ **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

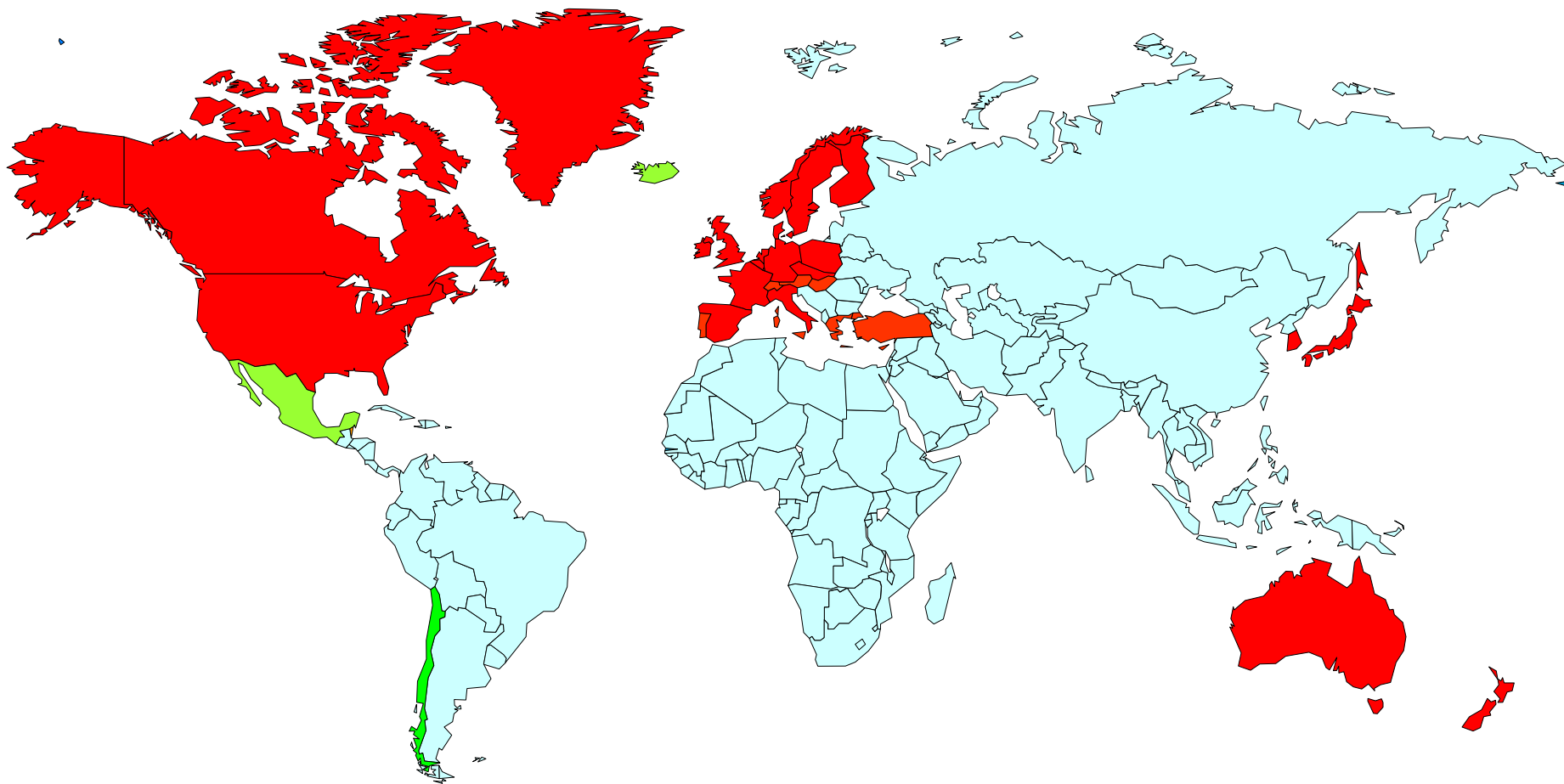
What statistics to collect?



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**

How IEA Statistics developed over time

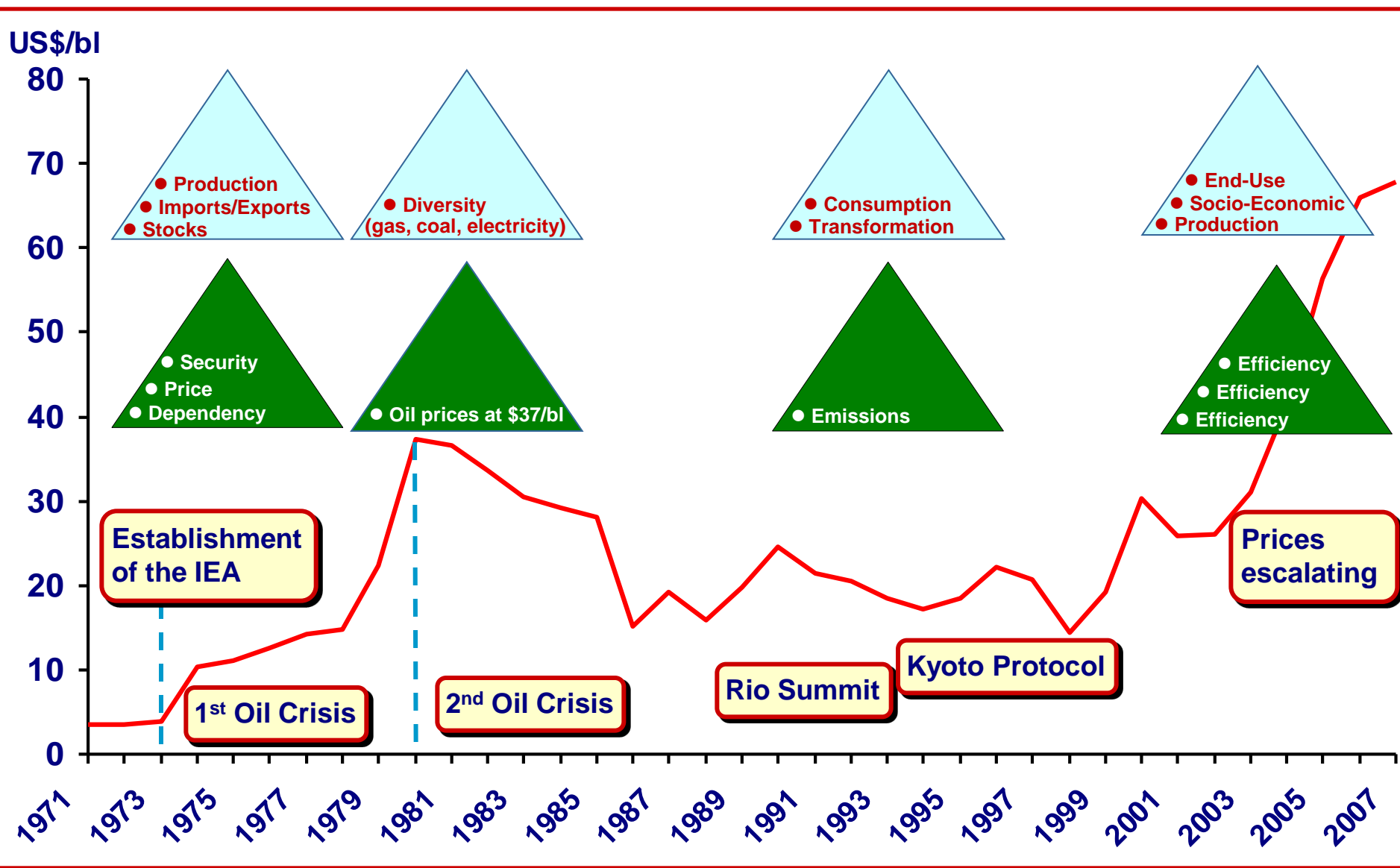


Member countries

 IEA
 OECD

- Autonomous Agency of the OECD
- Established in 1974 after 1st Oil Crisis
- 28 Members Countries (vs. 34 for OECD)
- 3 Es: Energy security, Economy and Environment

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**

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)

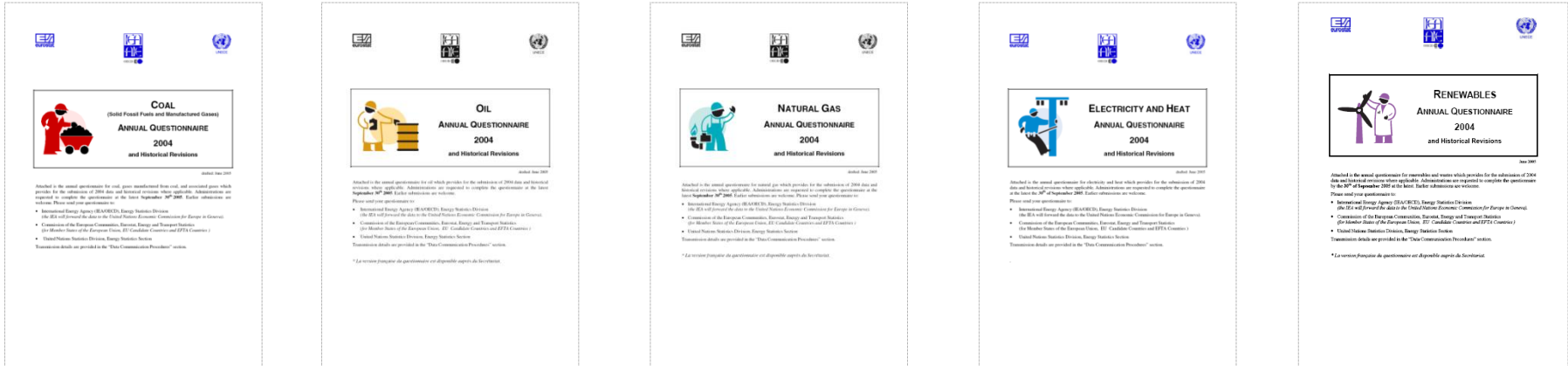
ÜBEREINKOMMEN
ÜBER EIN
INTERNATIONALES ENERGIEPROGRAMM
(In der Fassung vom 7. August 1992)

Decisions of Governing Board



Decisions of Specific Committees (Emergency preparedness, etc.)

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



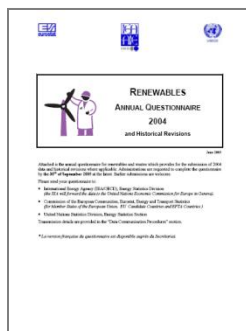
TOTAL: 95 FLOWS

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



Prepared in
June-July













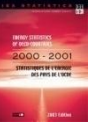






**National
Administrations**

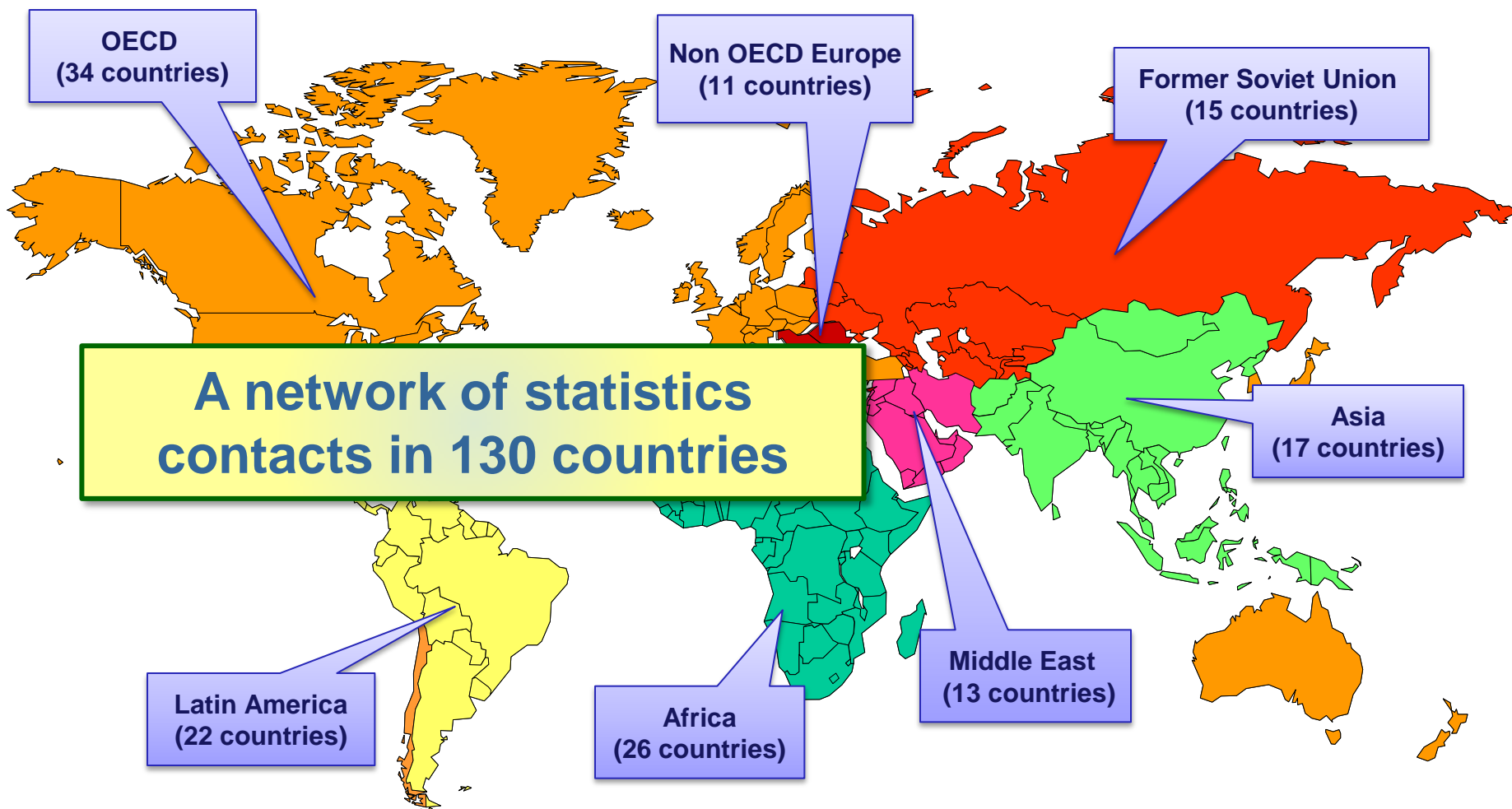


Queries

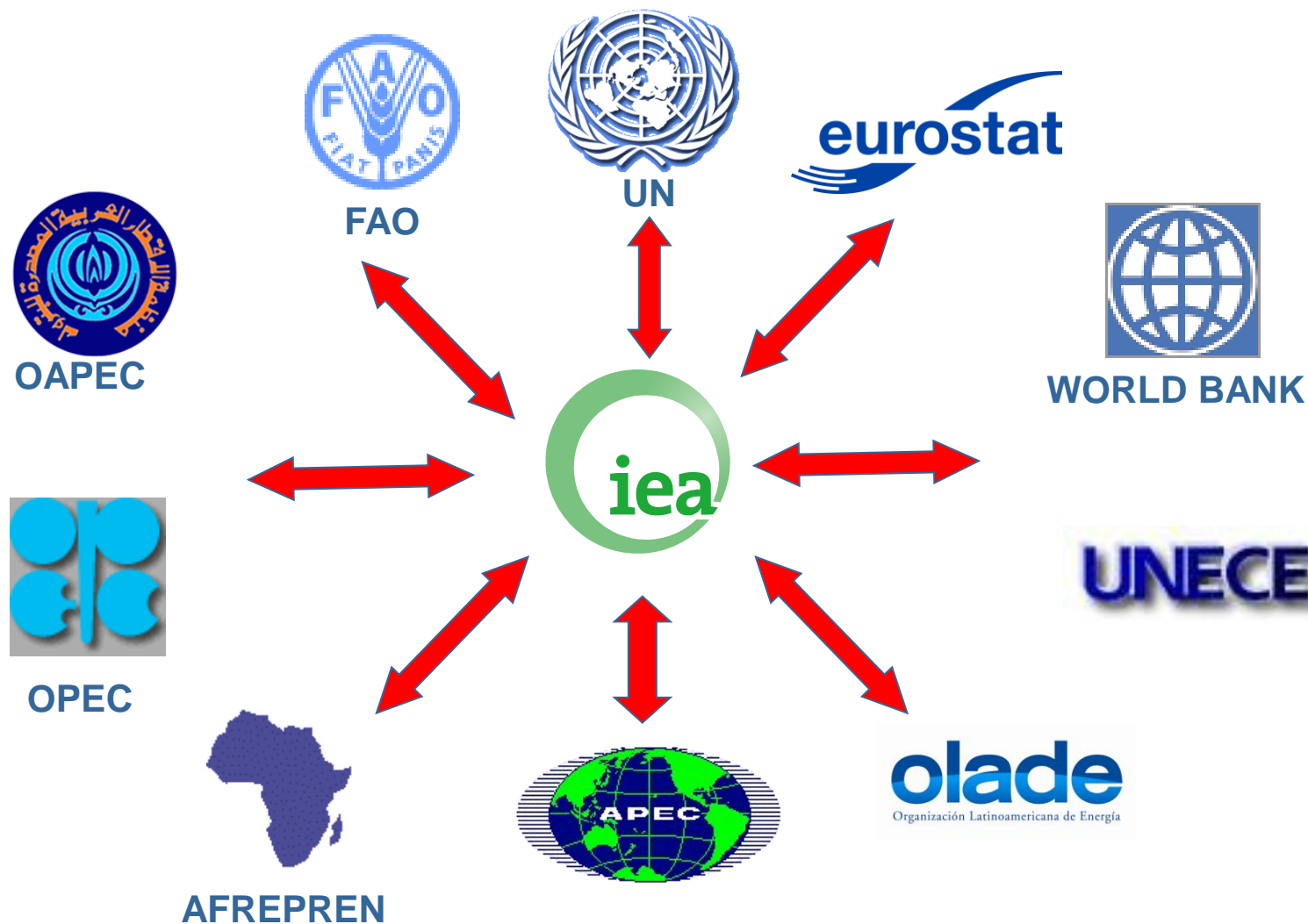
The annual OECD statistics cycle

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


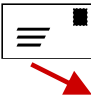
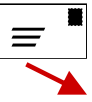
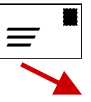






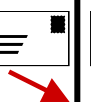















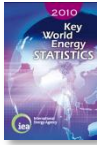
How non-OECD data are collected



How non-OECD data are collected (cont.)

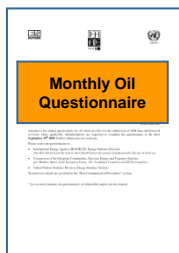


The annual non-OECD statistics cycle

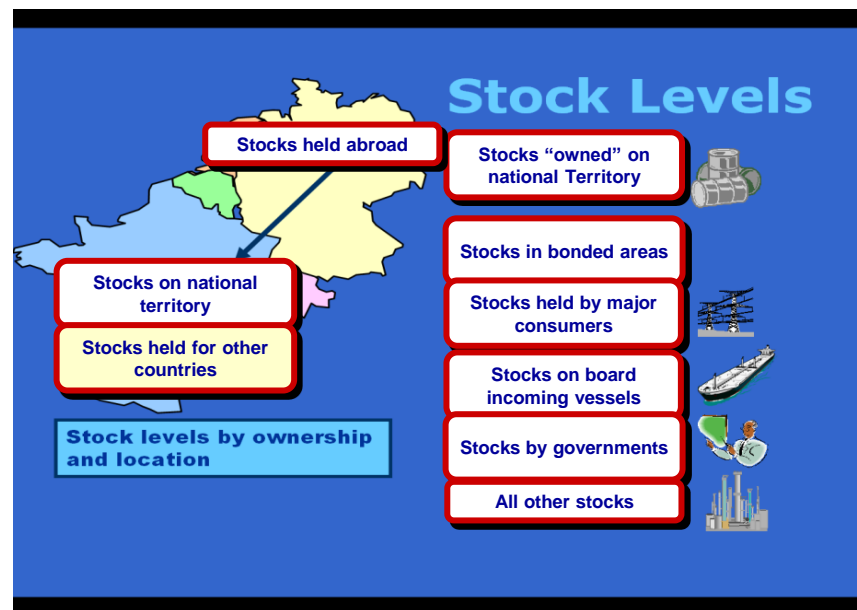
	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June	July	Aug	Sep
Questionnaires														
Processing														
Databases														
Publications and CD-ROMS								OECD		Non-OECD				
														



Monthly Oil Questionnaire (MOS for M-2)



- Production
- Imports/Exports by Origin and destination
- Refinery data
- Deliveries
- Stock levels





Joint Oil Data Initiative JODI



- Limited data points but timely
- Joint APEC/Eurostat/IEA/IEF/OLADE/OPEC/UNSD questionnaire

- Production
- Imports/Exports by Origin and destination
- Refinery data
- Deliveries
- Stock levels

Country _____

Month _____

Unit : _____

		Crude Oil	NGL	Other	Total		Petroleum Products							
							LPG	Naphtha	Gasoline	Jet Kerosene	Kerosene	Gas/ Diesel Oil	Fuel Oil	Other Products
Production						Refinery Output								
From Other sources						Receipts								
Imports						Imports								
Exports						Exports								
Product Transfers/Backflows						Products Transfers								
Direct Use						Inter Products Transfers								
Stocks	Closing					Stocks	Closing							
	Change						Change							
Statistical Difference						Statistical Difference								
Refinery Intake						Demand								

Other = Refinery Feedstocks+ Additives + Other Hydrocarbons

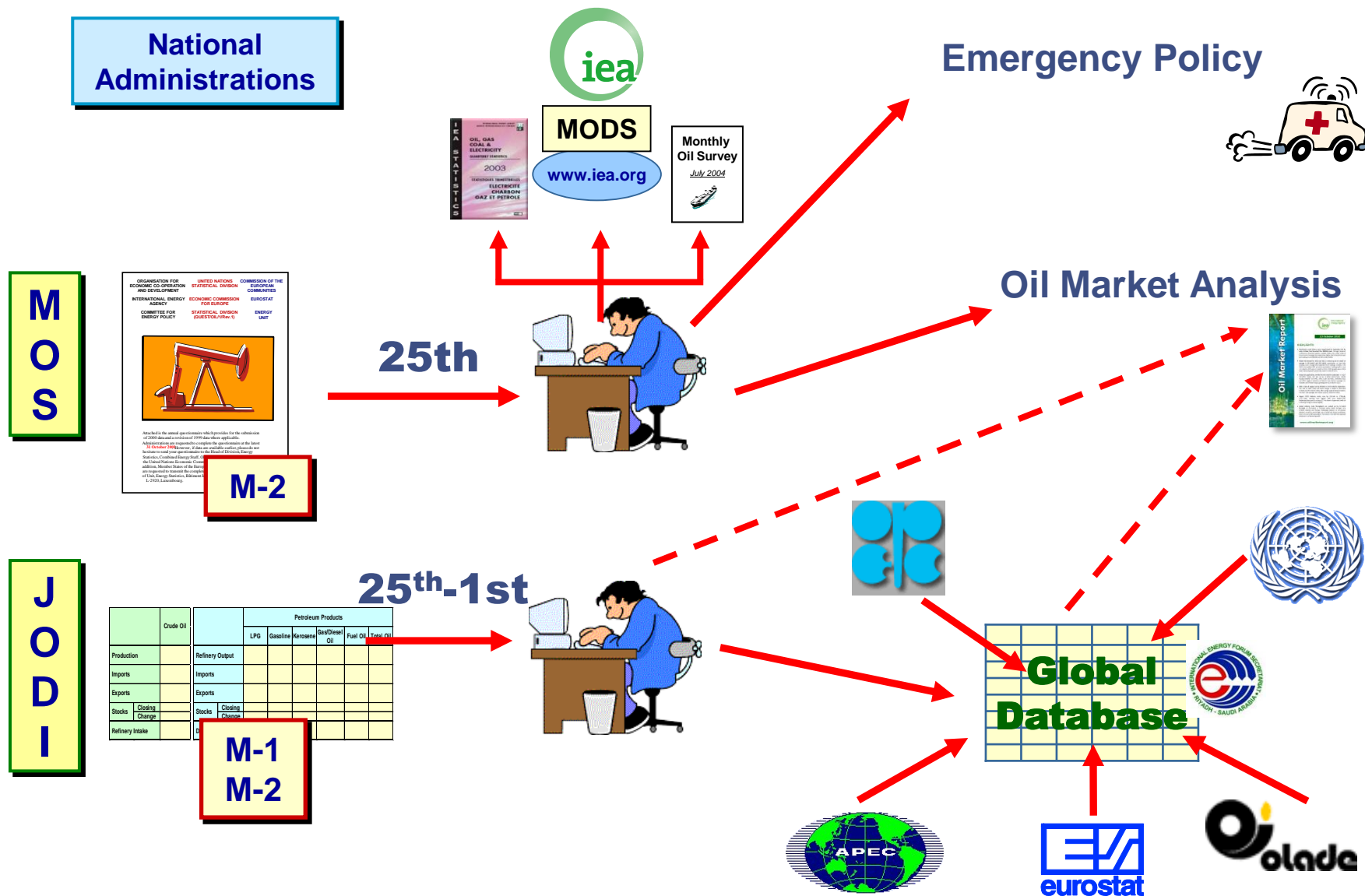
Receipts = Primary Product Receipts + Recycled Products

Other Products= Refinery gas + Ethane + Petroleum Coke + Lubricants + White Spirit + Bitumen + Paraffin Waxes + Other Petroleum Products

Total = 128 cells or 86 new cells

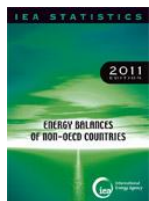
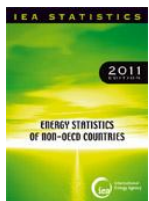
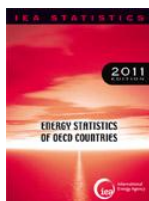
= New Cells

How are monthly oil data collected and released?





Books



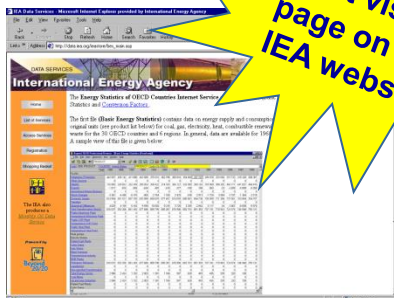
CDs



Internet



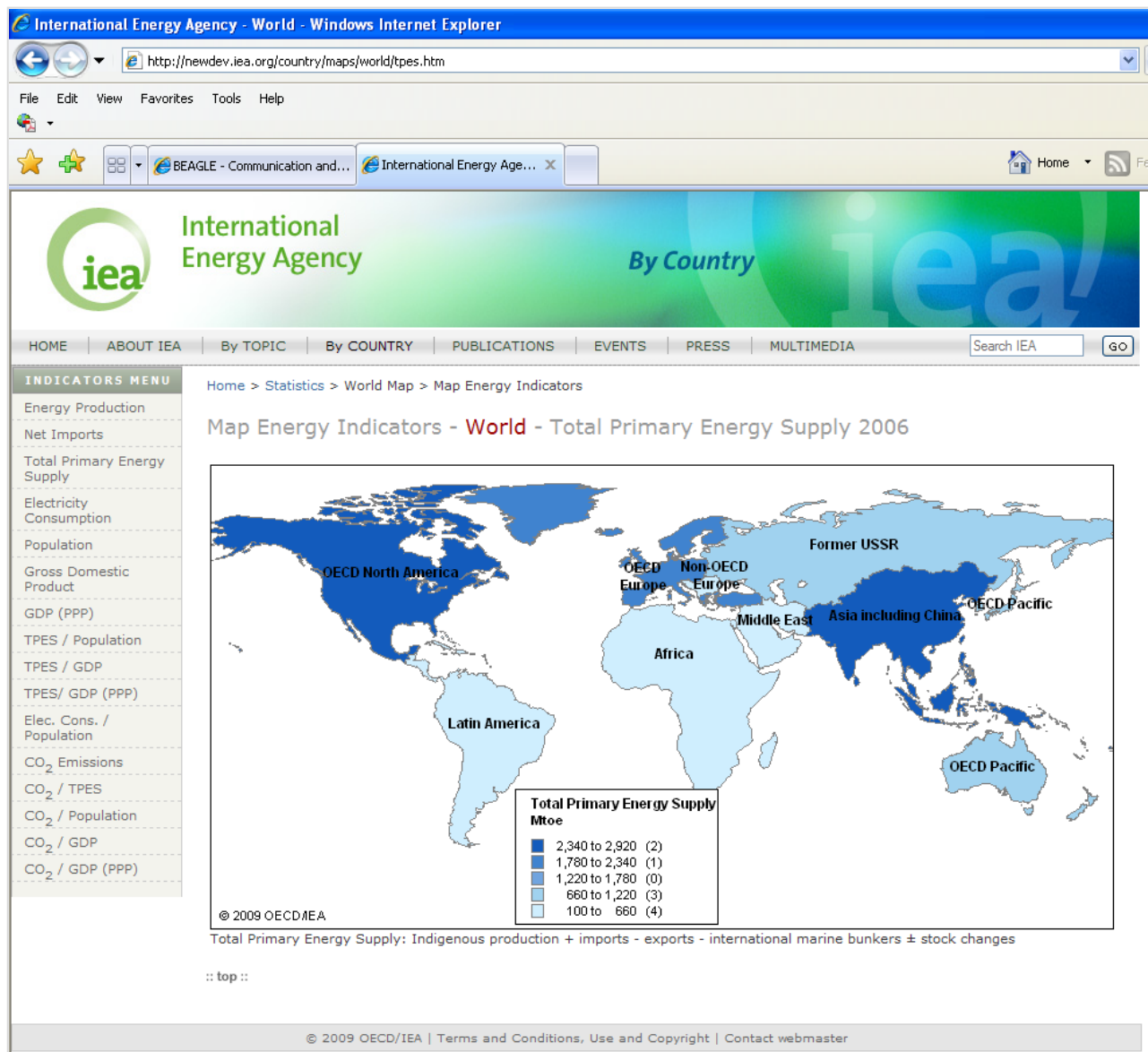
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Publications for Sale

- Electricity Information 2008 with 2007 data
- Energy Balances of OECD Countries 2008 Edition

Publications/Surveys Free for Download

- 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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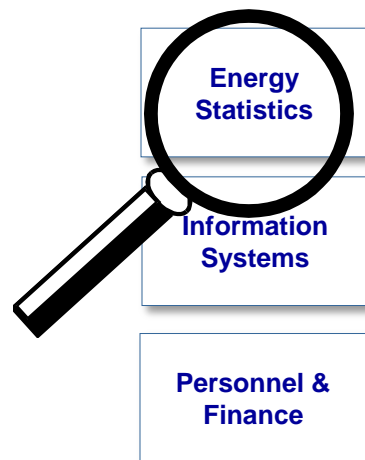
IEA Energy S...

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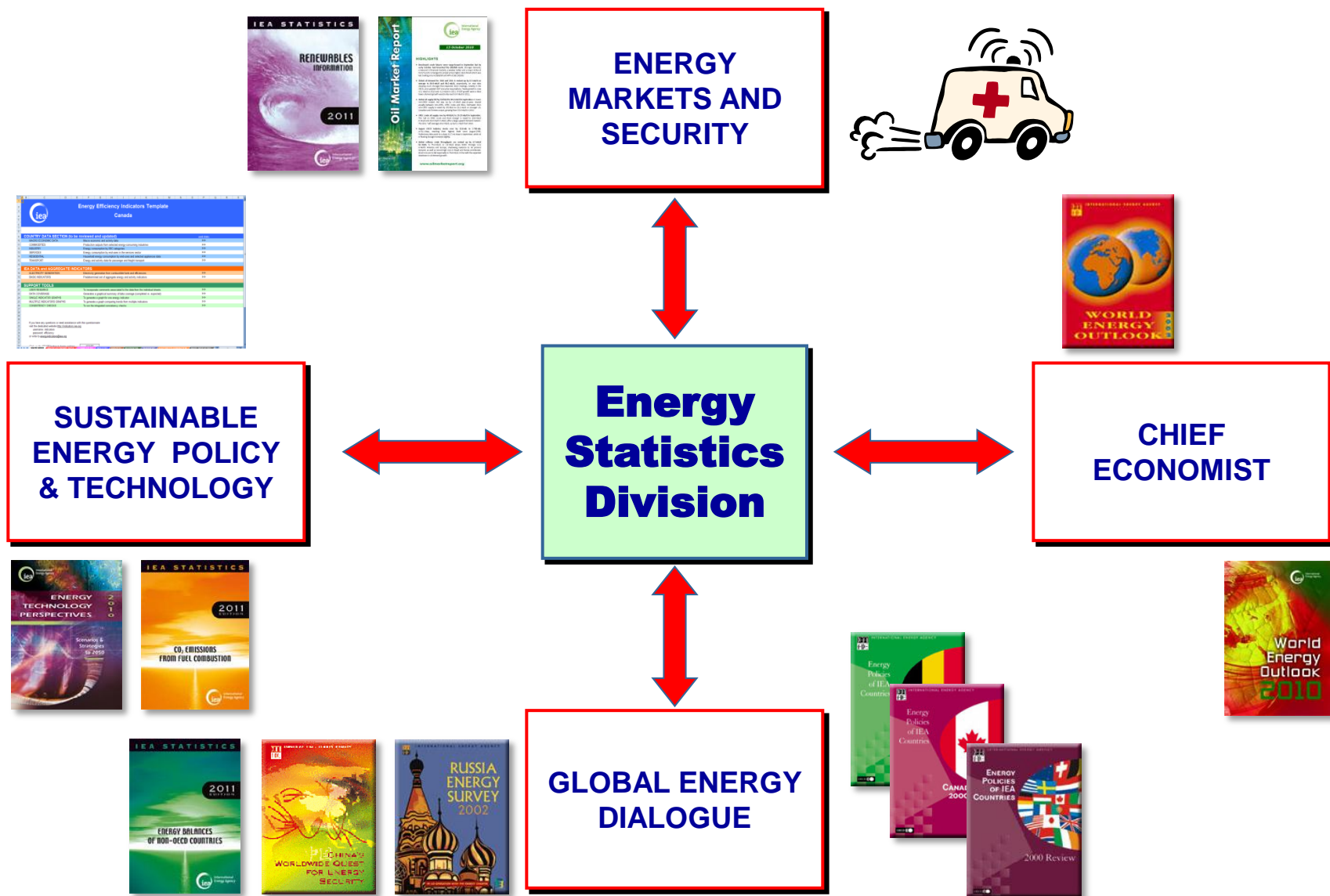
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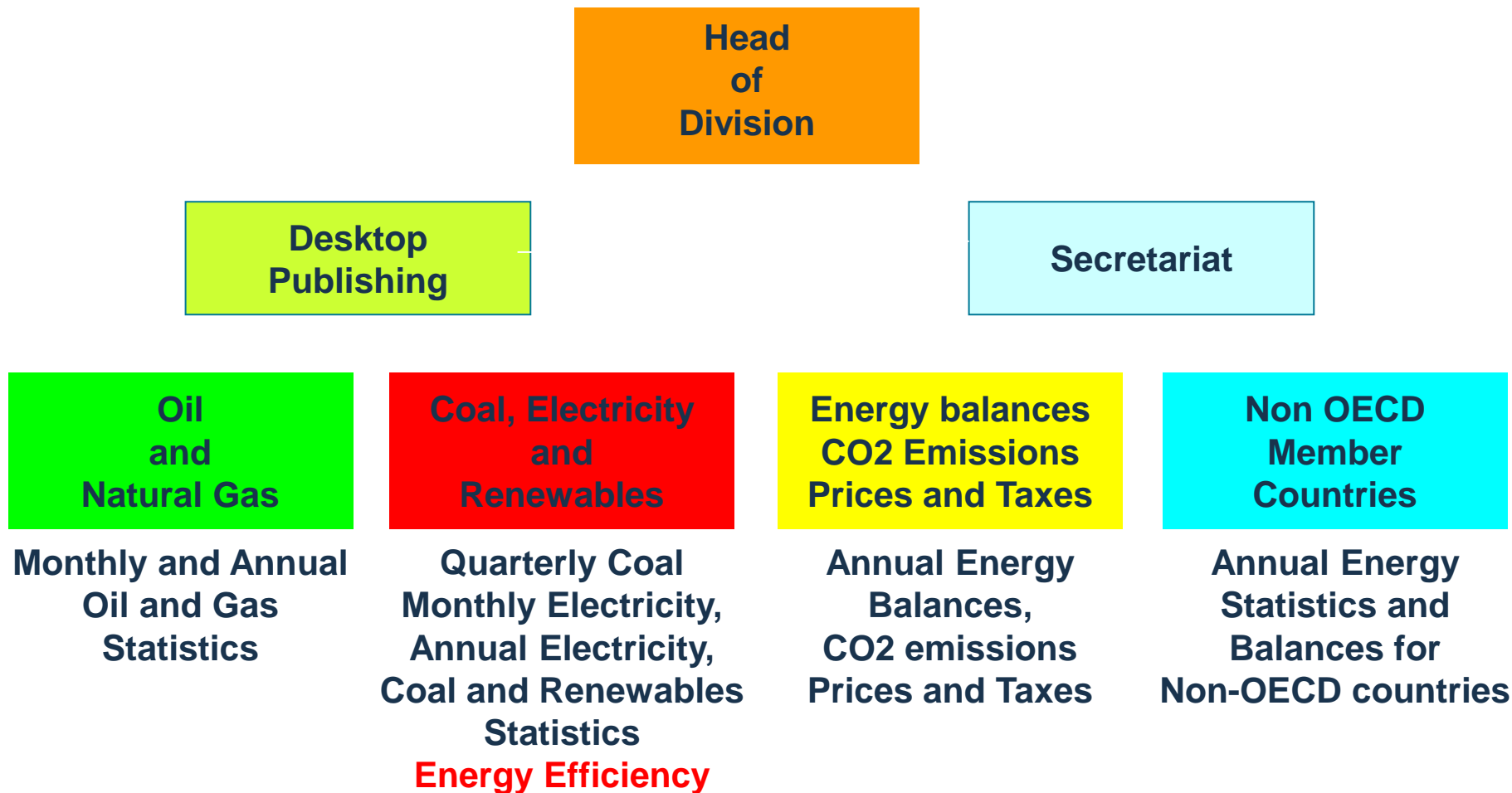
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The “Heart” of the Agency



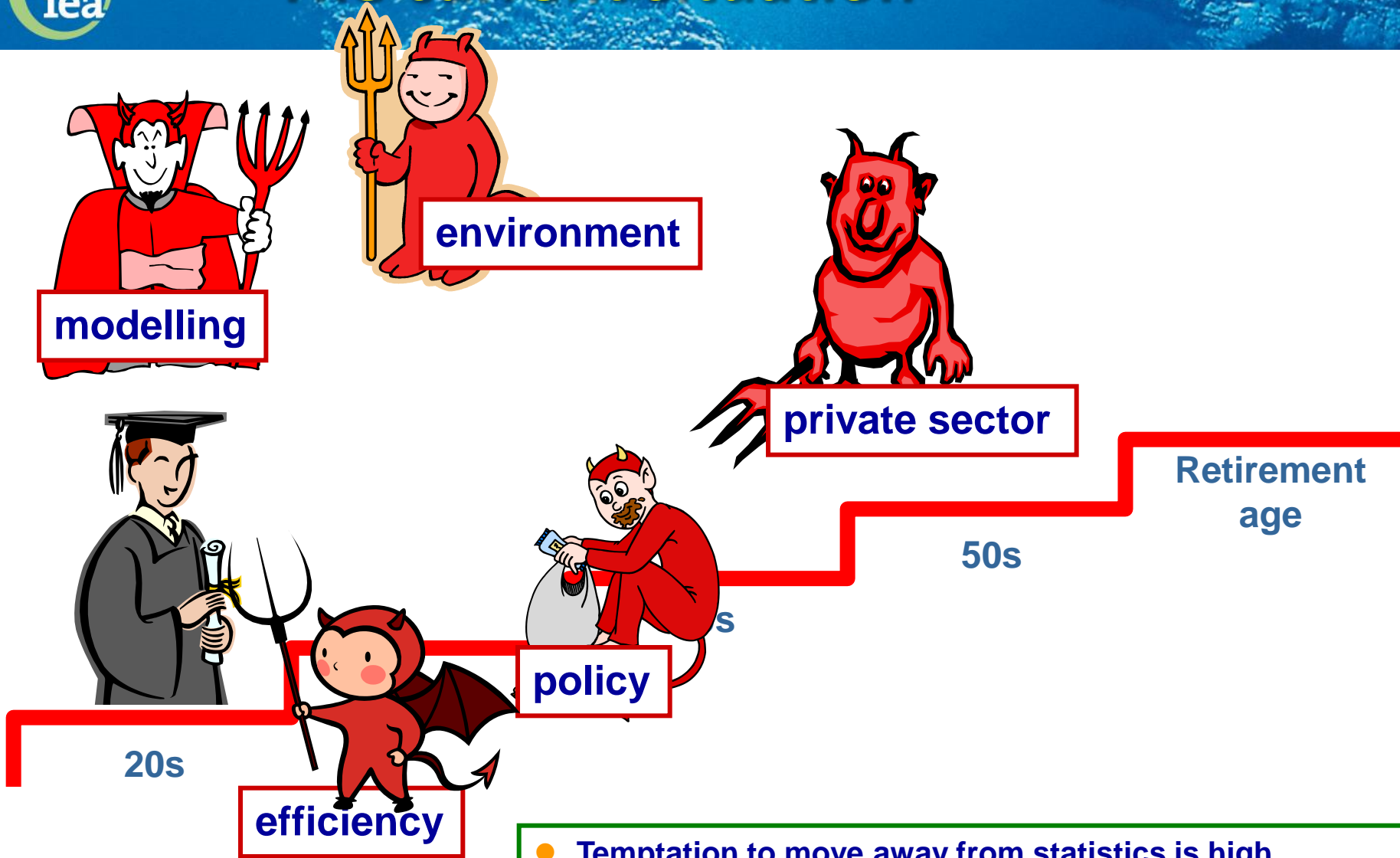
The IEA Energy Statistics Division



- 👉 **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

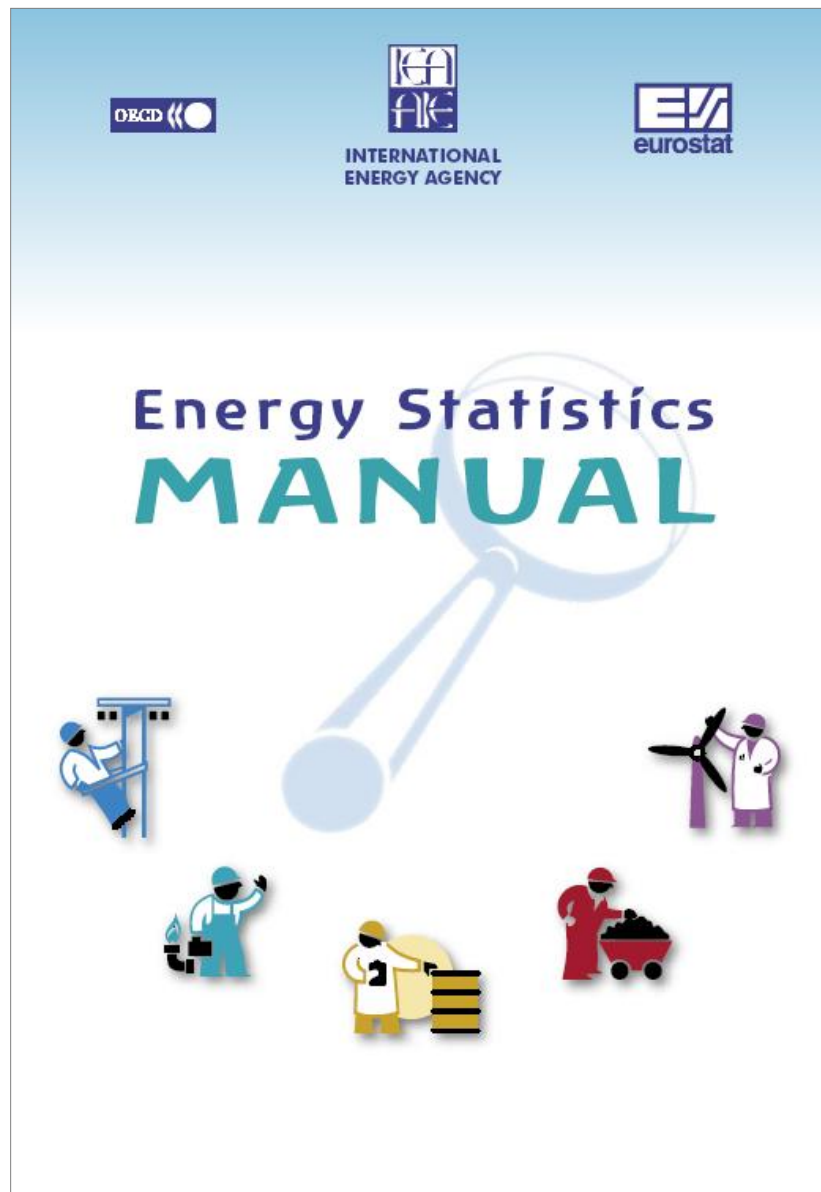
Facilitating the work of newcomers in statistics:

- 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



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 to general practice and not rigorous. Annex 1 provides for explanations of 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.

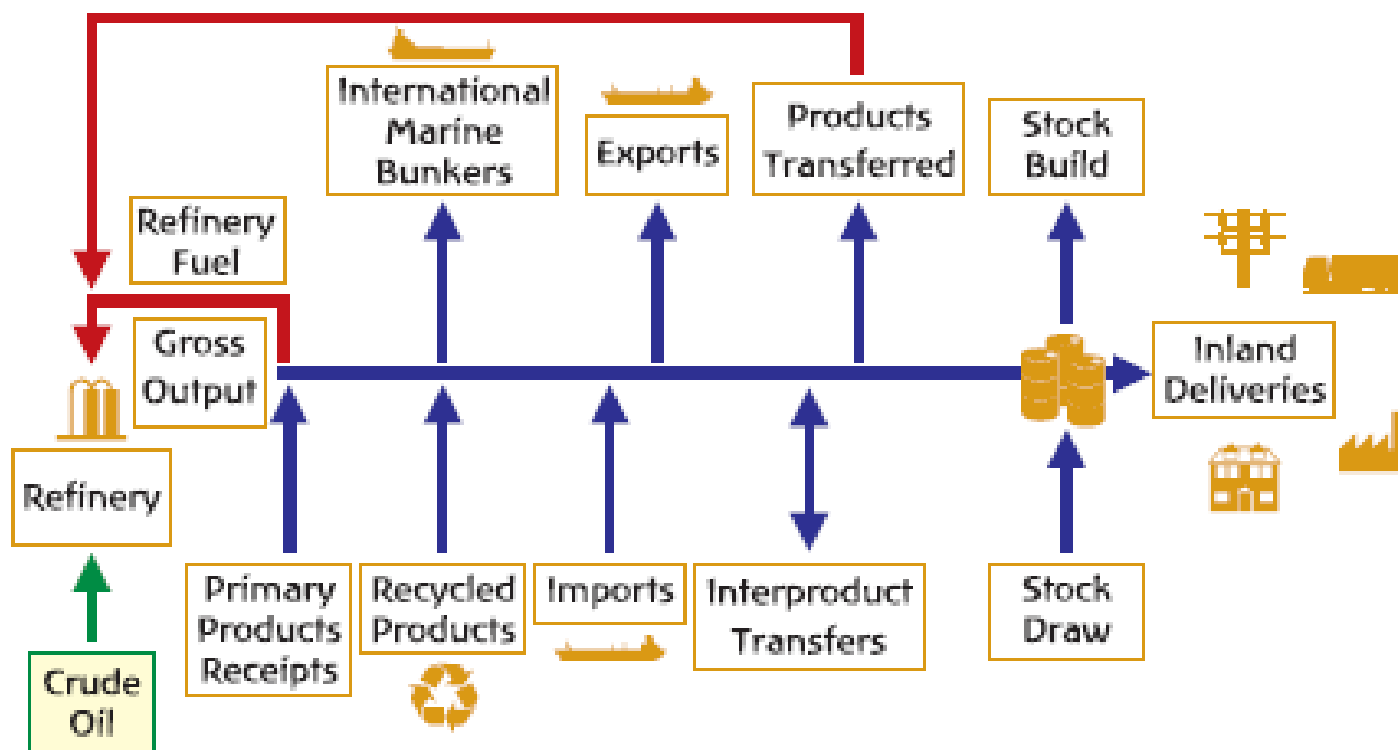
Refinery intake is the total amount of oil to have entered the refinery process.

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

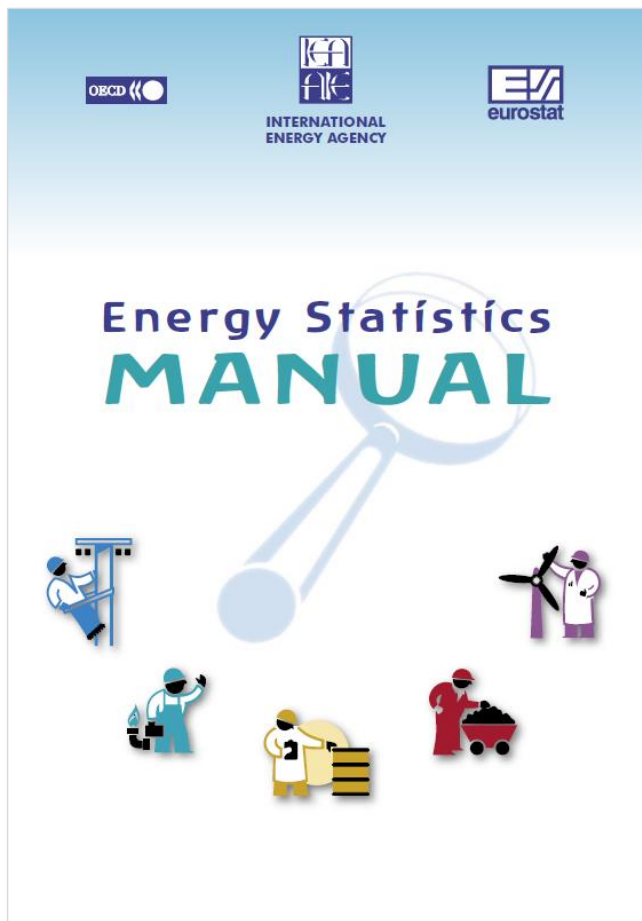
Figure X • Supply of Finished Products



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.

What does the IEA do to help countries improve their statistics (1)

The Manual is now available in 10 languages and widely used all around the world



Facilitating the work of newcomers in statistics:

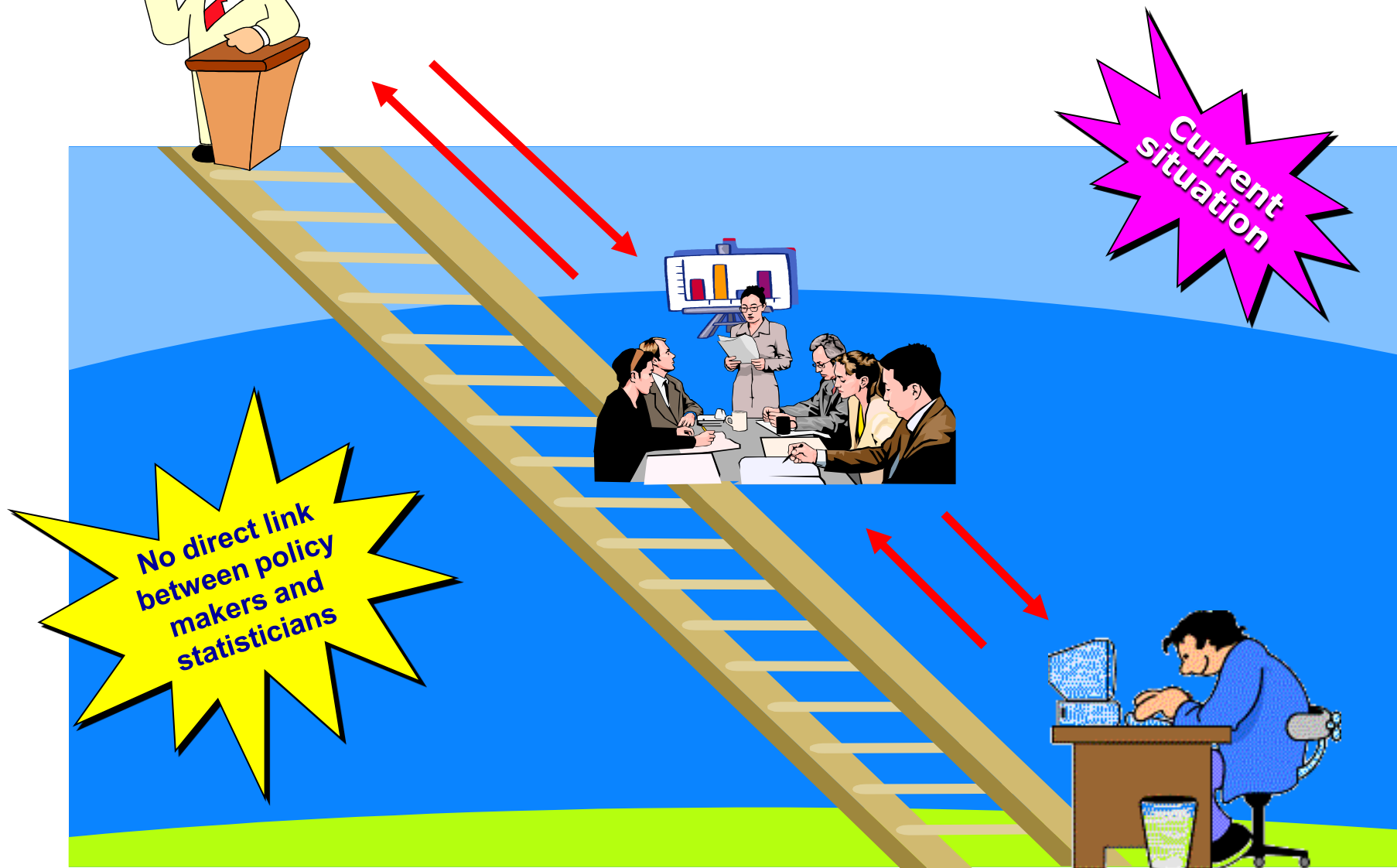
- **Energy Statistics Manual**
- **User-friendly electronic questionnaires**
- **Training**

Raising the profile of energy statistics and the role of statisticians

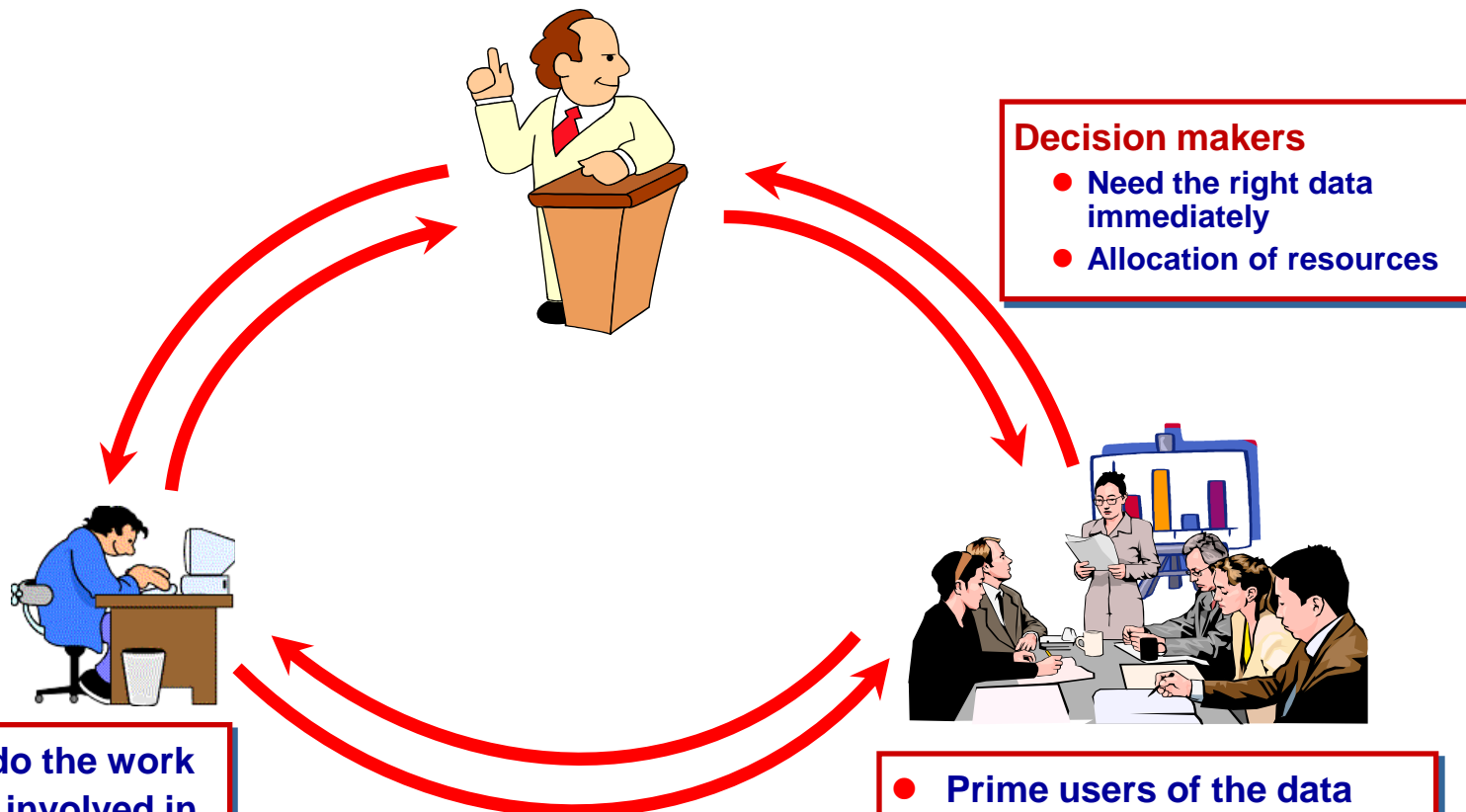
- **Ministerial meetings**
- **Governing Board Meetings**

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



Decision makers

- Need the right data immediately
- Allocation of resources

- The ones who do the work
- Should be fully involved in the whole process

- ➔ Statisticians need to understand why they collect the data
- ➔ Policy makers need to understand the problems faced by statisticians

- Prime users of the data
- Advisors to policy makers
- Interface between policy makers and statisticians

- ➔ Lobby
- ➔ Comments on data



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

Facilitating the work of newcomers in statistics:

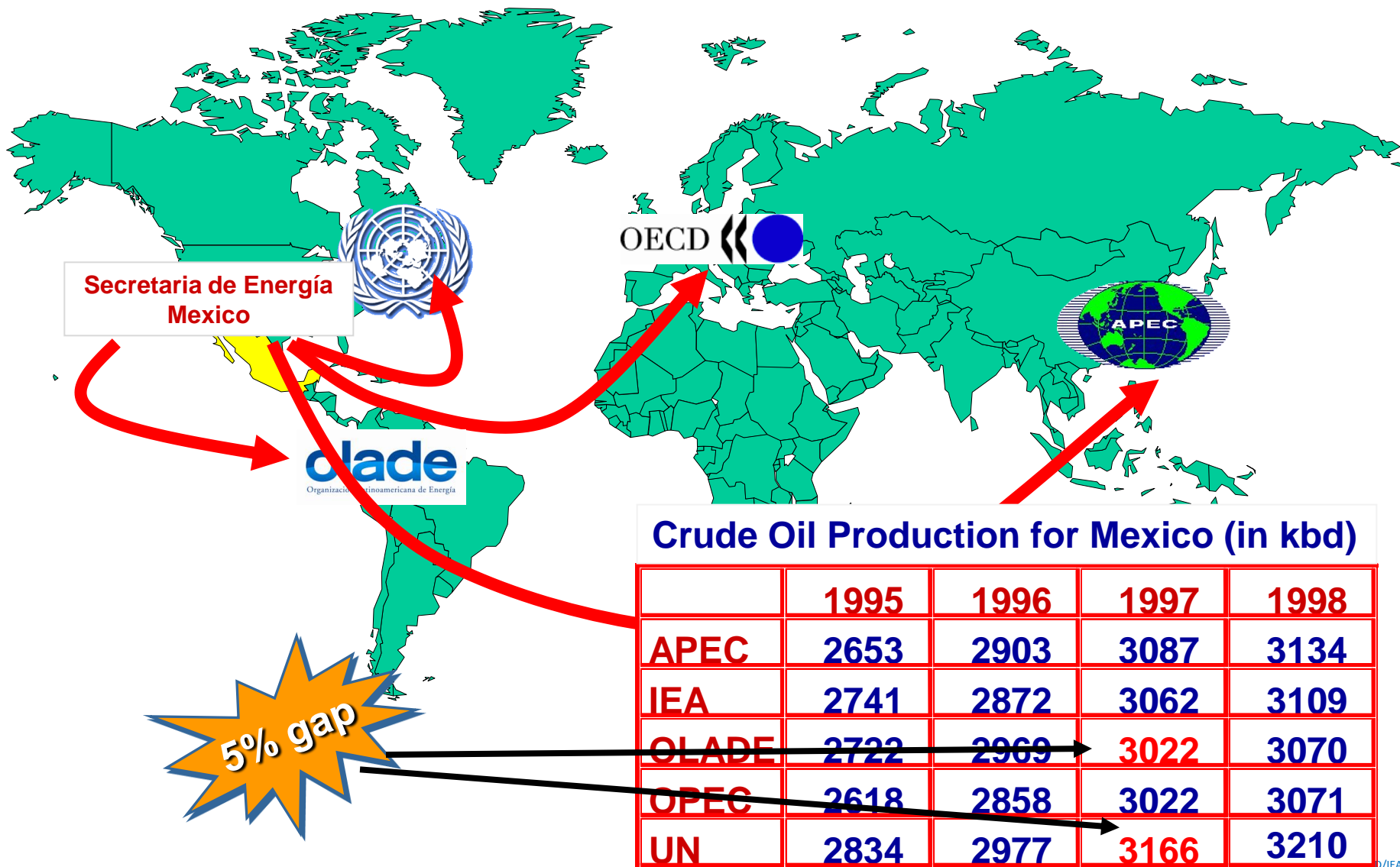
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Raising the profile of energy statistics and the role of statisticians

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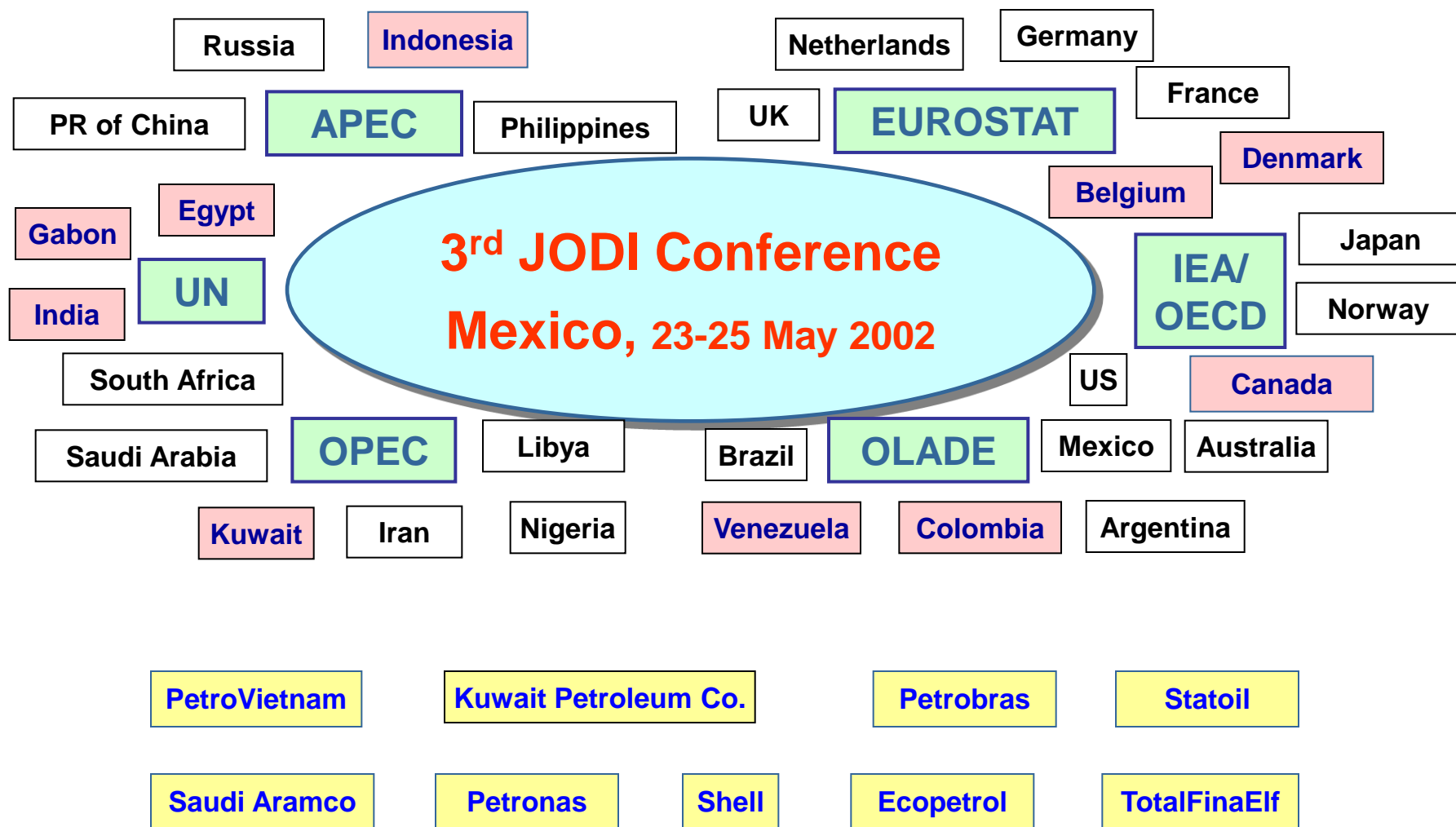
Harmonisation and Cooperation

Harmonisation and Cooperation





JODI: The key to success: cooperation between countries, organisations and companies



The JODI database is open to all and updated every month

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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	10,2													2,183	
Latvia	7													1,212	
Libya	5,9													0	
Lithuania	1,7													1,986	

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

Done Local intranet

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



Joint

Oil

Data

Initiative



Organisations: APEC, Eurostat, IEF, IEA, OLADE, OPEC, UNSD,
(GECF for gas)

Strengthening Harmonisation and Cooperation

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



- 21 international/regional organisations
- Both data providers and users
- Harmonisation of definitions
- Common training sessions
- A joint website

UN Statistics
Commission decided
to use InterEnerStat
definitions as the basis
for IRES

InterEnerStat

Harmonisation of Definitions
of Energy Products and Flows



SECOND REVISION OF THE DEFINITIONS Part 1: Flows

IEA, Paris, 20 September 2009

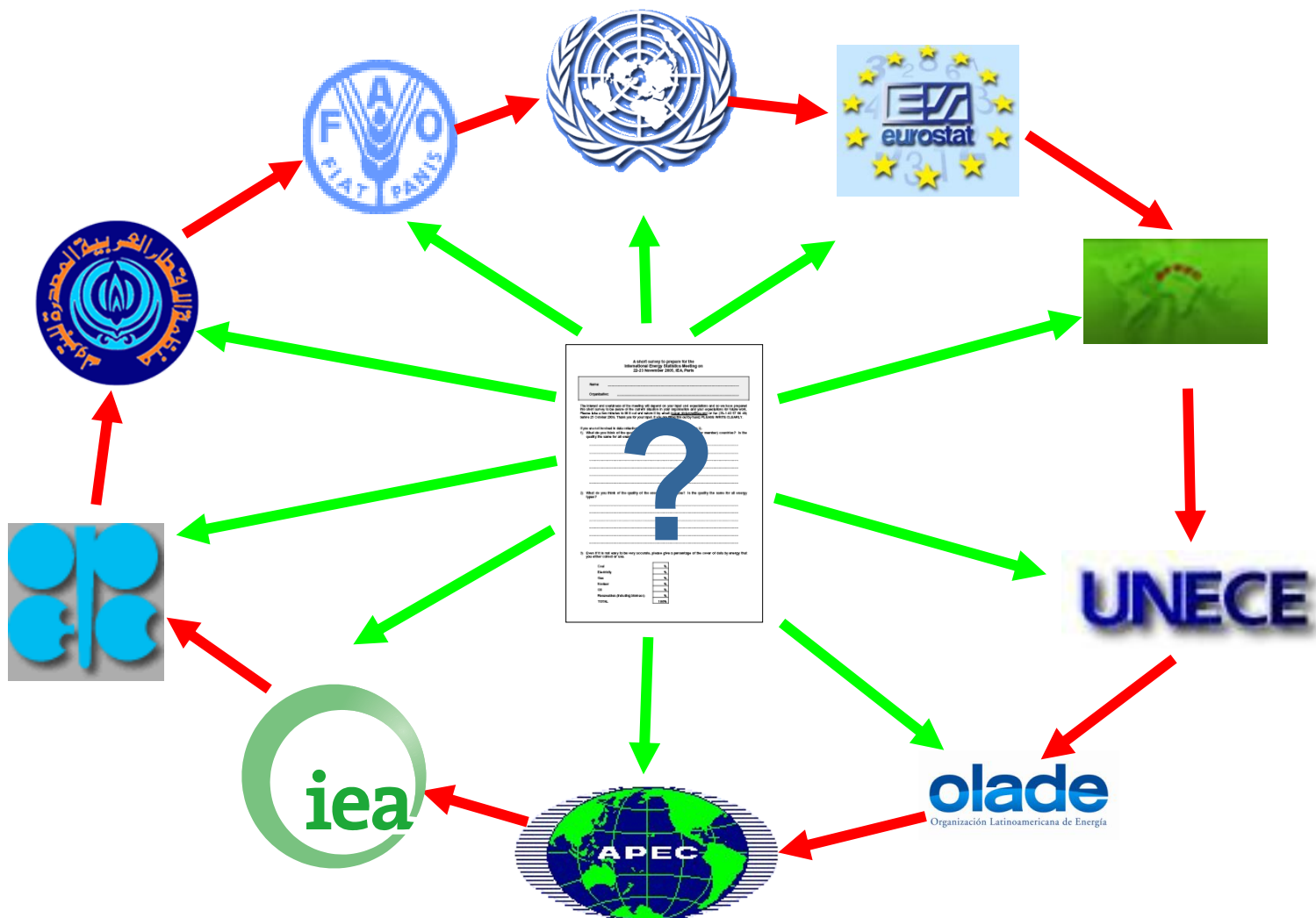
InterEnerStat

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
- ☐ Shale gas
- ☐ Ethanol

- New forms of energy

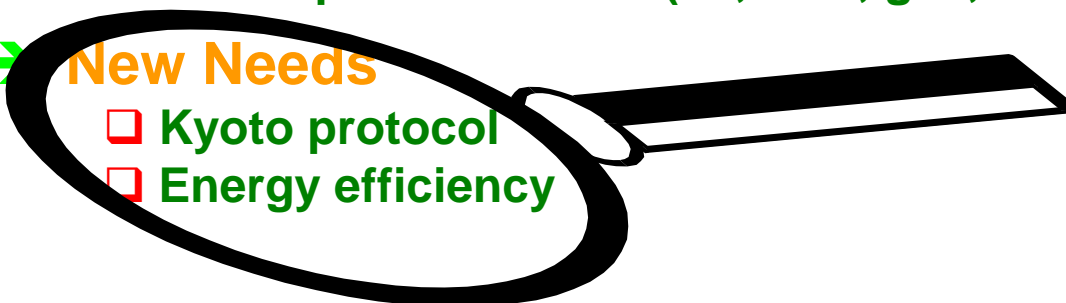
- ☐ Wind
- ☐ Photovoltaic
- ☐ Hydrogen

- New players

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

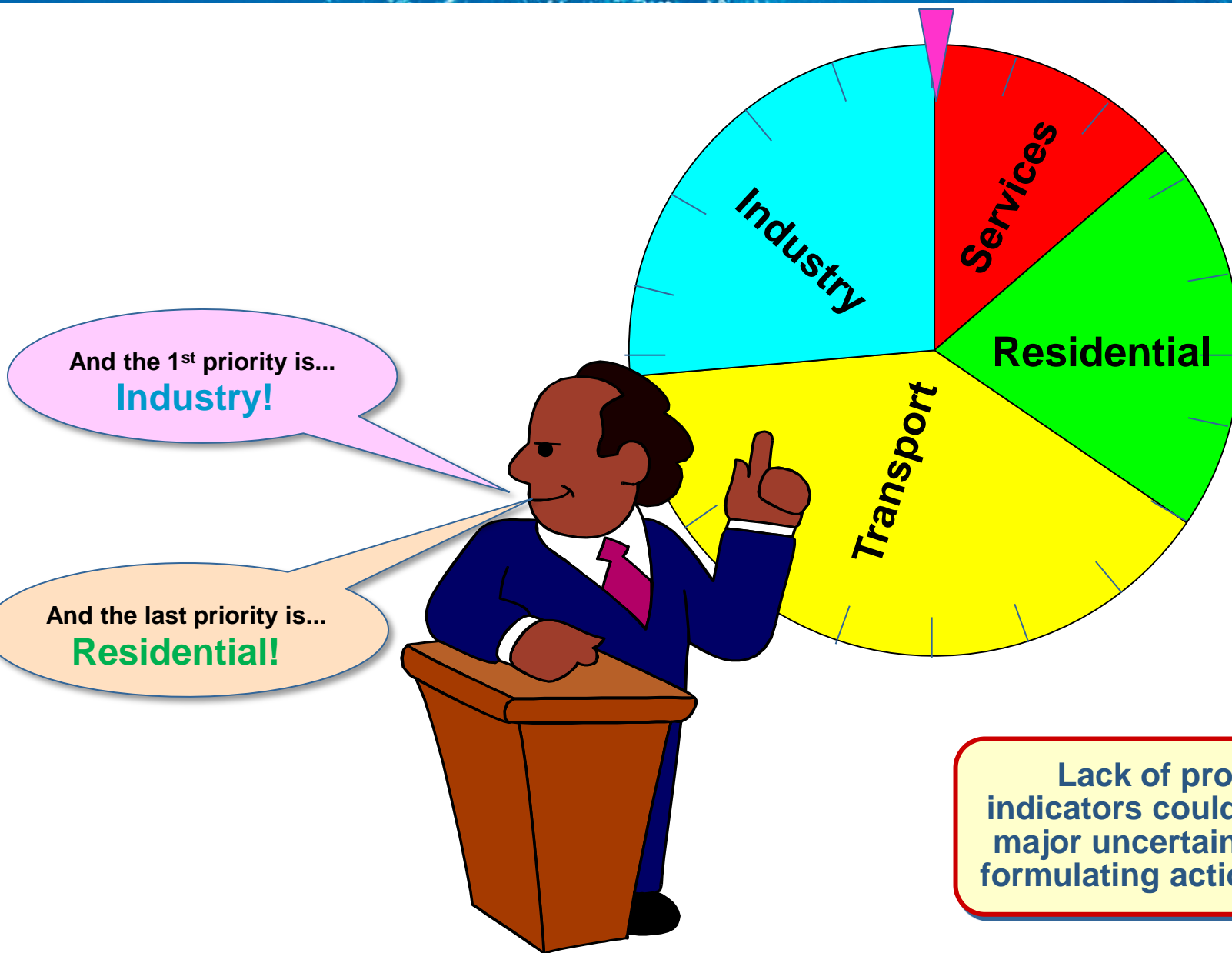
- New Needs

- ☐ Kyoto protocol
- ☐ Energy efficiency



- **Saving energy in all sectors:**
 - Residential
 - Transports
 - Industry
 - Services
 - Electricity generation
- **Increasing exports - reducing imports**
- **Increasing domestic (and global) energy security**
- **Strengthening RD&D**
- **Creating jobs**
- **Reducing greenhouse gas (mainly CO₂) emissions**

Energy efficiency is becoming a priority, but in many cases there is no data to launch sound energy efficiency policy and actions



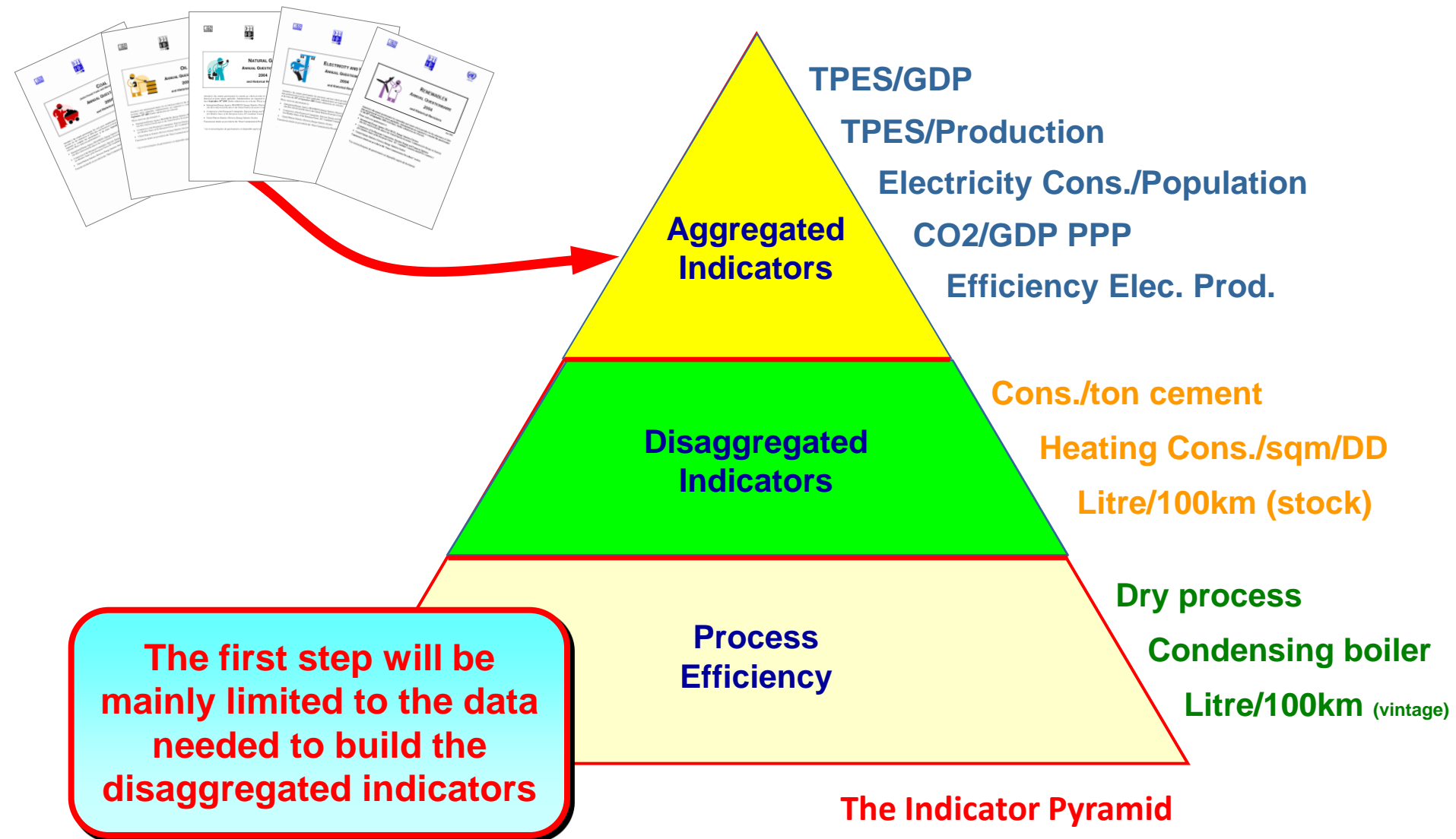
Lack of proper indicators could lead to major uncertainties for formulating action plans

The other extreme would be to have too many data

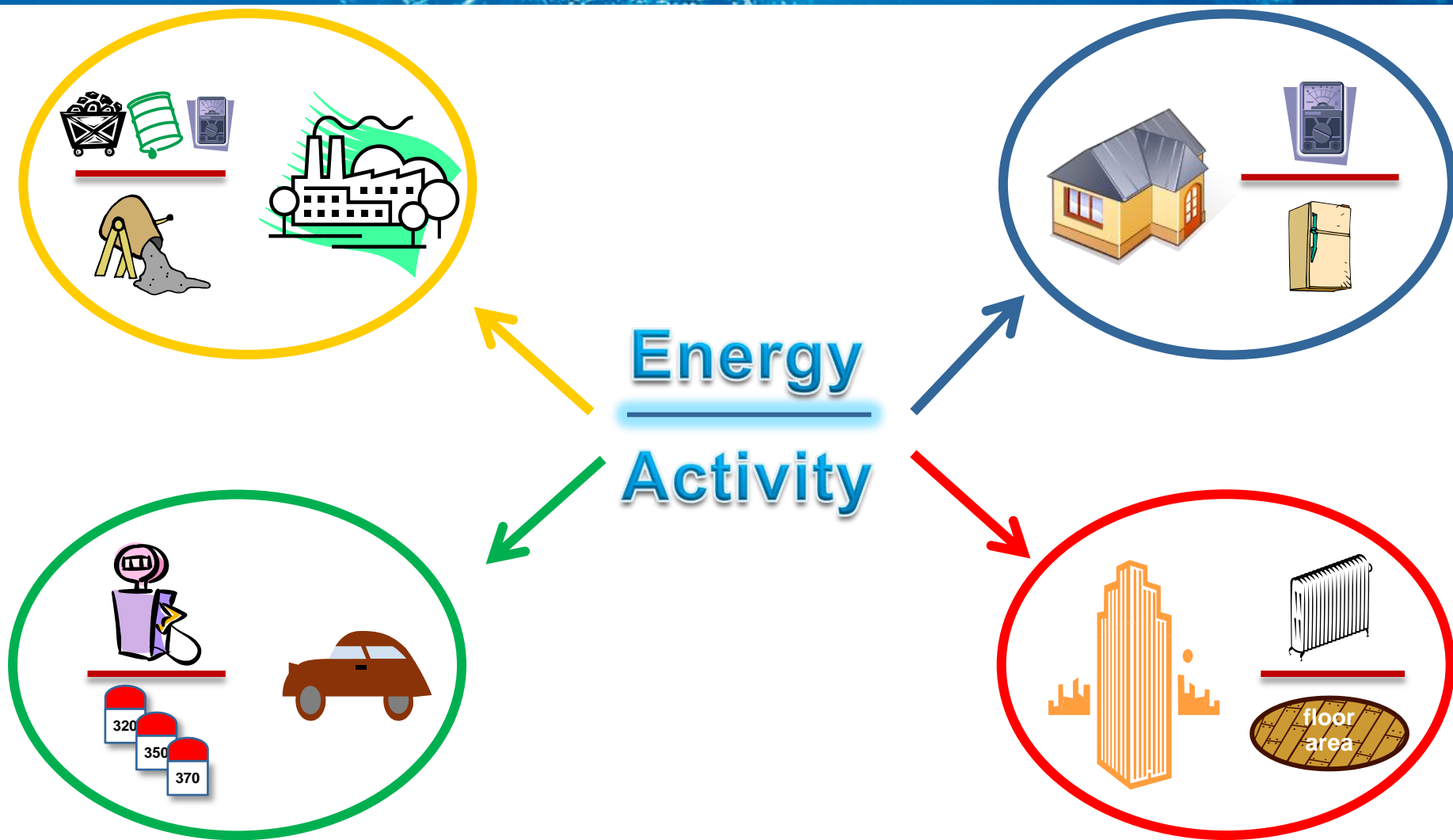


... but it would be a much easier situation!

What data for what indicators



What data for what indicators?



Not only energy data, but also activity data are necessary.



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

Tuesday 14

Opening

Introduction to energy
statistics

Russian statistics

Coal

Wednesday 15

Oil

Natural Gas

Renewables

**Electricity
and heat**

Thursday 16

**From basic
statistics to
energy
balances**

**Energy
Efficiency
Indicators**

**Estimating CO₂
Emissions**

**Additional
questionnaires**

Cooperation

Closing

Friday 17

Opening

Why a need for
monthly oil and gas
statistics








**A few words
on JODI**

Monthly Oil

**What
happens with
the data**

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 35+ years for the IEA to establish its statistics but it is a never ending process since 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 and 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 four days in order for us to better understand strengths and weaknesses of energy statistics in your country and for sharing our own experience of international energy statistics.
-  It is our sincere hope that this workshop will further strengthen the relationship between you and us, and between Russia and International Energy Agency.

Thank you