



The IEA and its Energy Data Centre

Duncan Millard, Chief Statistician, IEA
IEA/IPCC meeting 13th December 2017

Formed in 1973 in wake of oil embargo with mission to promote member country energy security – autonomous agency of the Organisation for Economic Cooperation and Development (OECD)

29 (30) member countries

Asia Pacific: Australia, Japan, Republic of Korea and New Zealand

Americas: United States, Canada, (Mexico, imminent)

Europe: Austria, Belgium, Czech Rep, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, Turkey and the UK, the **European Commission** also participates in the work of the IEA

Chile is in the process of accession to become members of the IEA

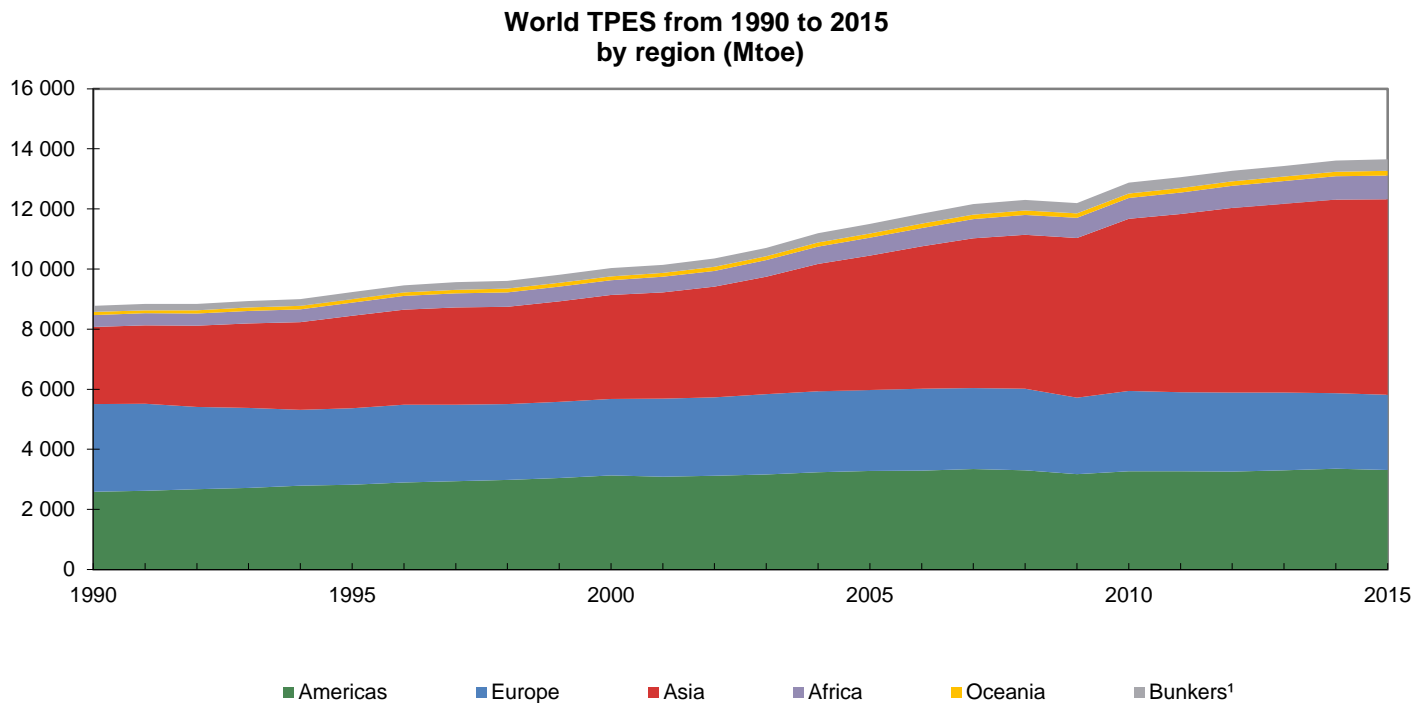
China, Indonesia, Thailand, India, Morocco, Brazil and Singapore are countries in **Association**

Decision-making body: Governing Board - Consists of member country representatives

Data and statistics at the heart of the Agencies work – directly and as input to analysis and advice

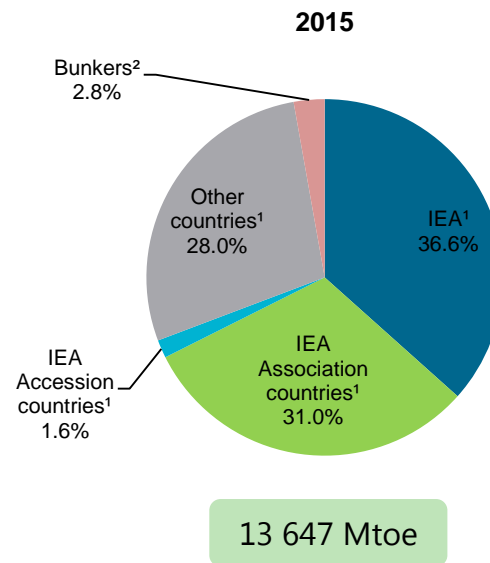
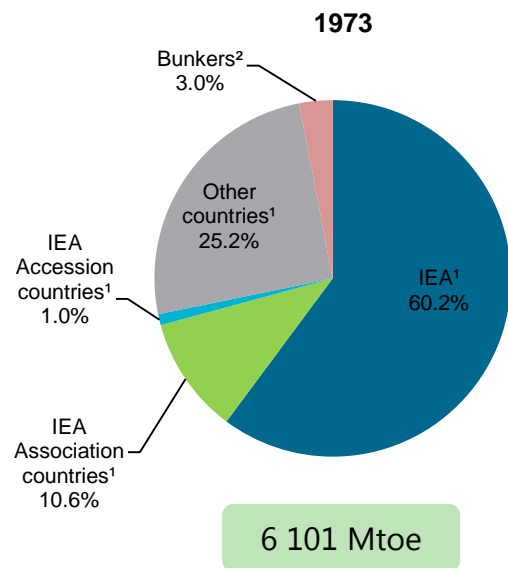
Modernisation and Open door policy started in 2015

Total primary energy supply (TPES) by region



Source: IEA, Key World Energy Statistics, 2017

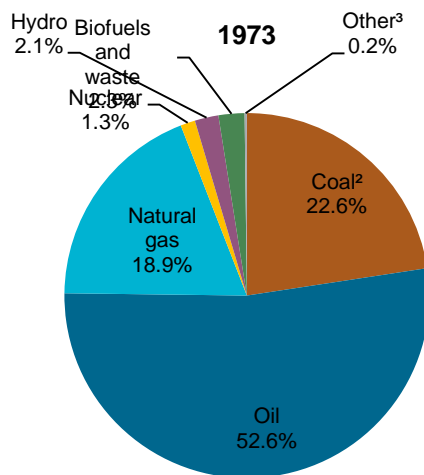
World total primary energy supply by region



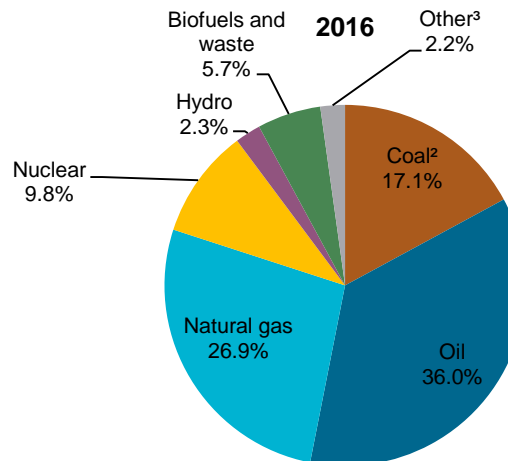
Source: IEA, Key World Energy Statistics, 2017

IEA and association countries use around 70% of energy, now unlike in 1973, the share between them is more equal

World total primary energy supply by fuel



3 740 Mtoe

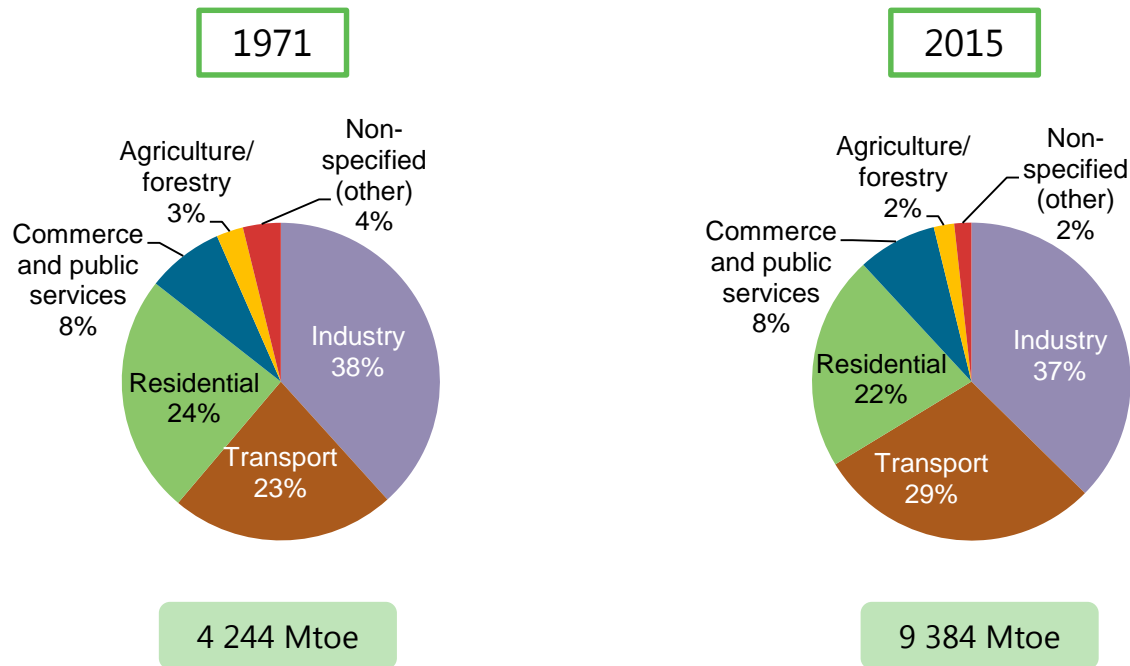


5 257 Mtoe

Source: IEA, Key World Energy Statistics, 2017

Oil remains key input fuel, with gas growing in importance

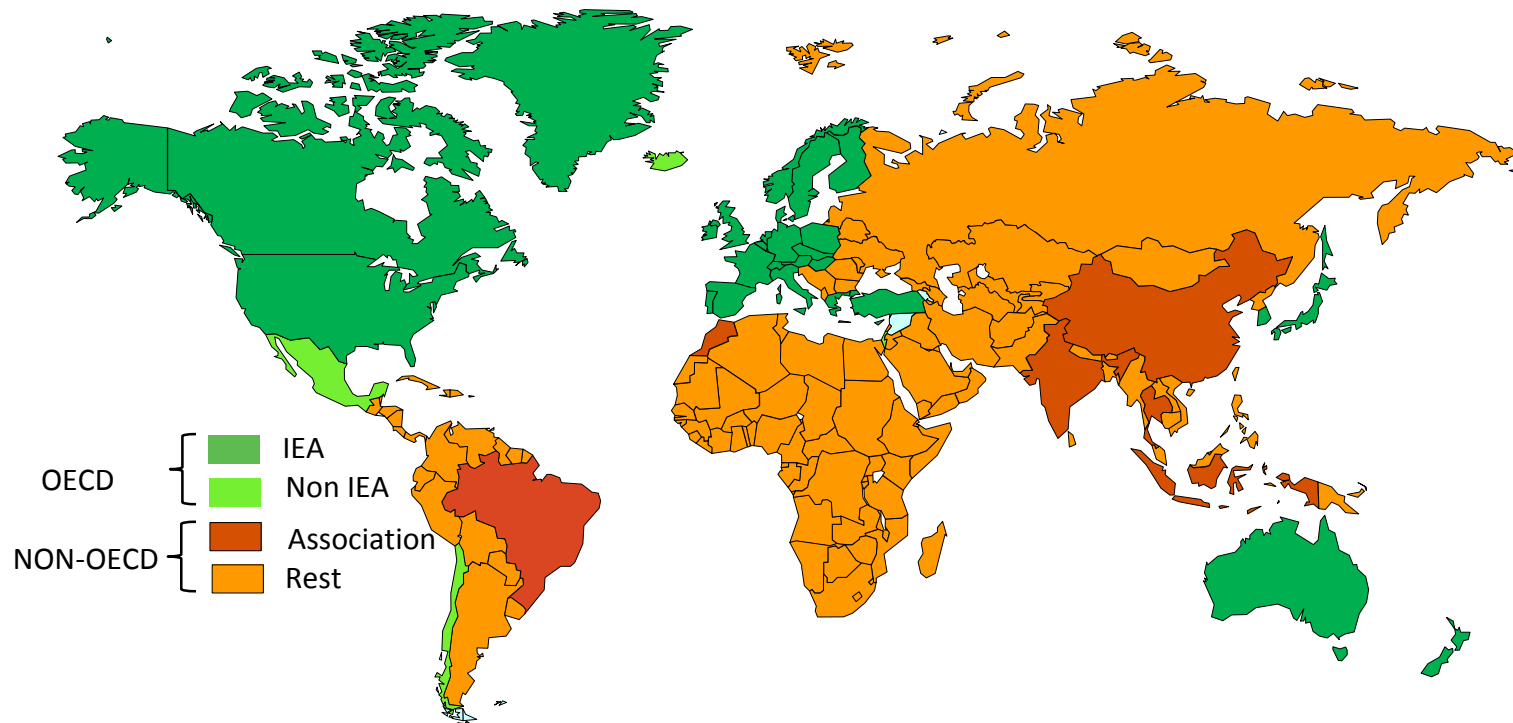
World total final consumption by sector



Source: IEA, World Energy Balances, 2017

Transport's importance for energy consumption is growing

- IEA collects data from 150 countries, on a voluntary basis for all non-OECD countries



OECD



- 5 annual Joint questionnaires (covering 95 flows over 75 products/categories)
- Annual collection on Energy efficiency, RD&D and forecasts
- Quarterly questionnaire on prices and taxes
- Monthly questionnaire
 - Electricity
 - Oil and gas (M-2)
 - Oil and gas (JODI) (M-1)
- Emergency questionnaires




Non-OECD

- Voluntary
- Joint IEA/UNECE/Eurostat questionnaires used by some and growing
- Network of statistics contacts in 120 countries
- Cooperation with international organisations

Common objective for all - to improve timeliness and detail of data sent to IEA

<http://www.iea.org/statistics/resources/questionnaires/>

- Covers end-use energy and activity for four sectors: residential, services, industry, transport
- Agreed by member countries in 2009 (IEA Ministerial)
- Developed with international experts, based on historical work on indicators (Odyssee, LNBL, etc)
- Disaggregation level varies across sectors
- Includes graphical tools for data quality checks

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

Annual and quarterly Publications

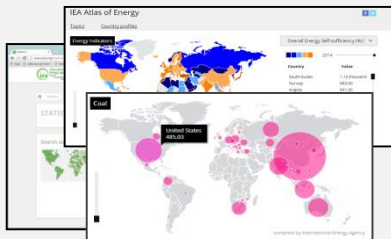
Fuel Information books, World energy statistics & balances, CO₂ emissions...



Free
overviews
from books
saw 15,000
downloads in
first 3 weeks

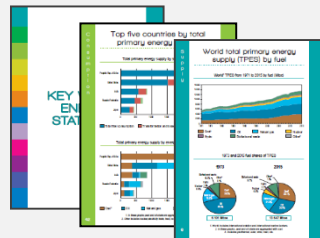
IEA website

Atlas, Sankey flows...



Booklet

Key World Energy Statistics



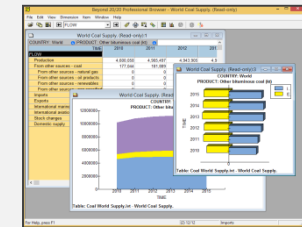
Mobile App

Android, apple and windows

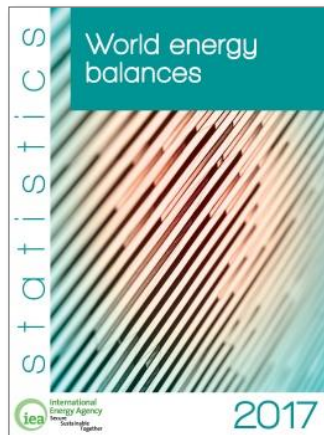


Electronic data files

Data online service



World energy balances

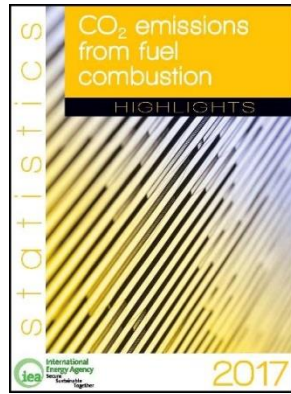


- Comparable data for over 150 countries and regions in balance format
- Same definitions
- Country notes to explain

World												
2015												
Milion tonnes of oil equivalent												
SUPPLY AND CONSUMPTION	Coal ¹	Crude oil ²	Oil products	Natural gas	Nuclear	Hydro	Geothermal/Solar/etc.	Biofuels/Waste	Electricity	Heat	Total	
Production	3871.53	4416.26	-	2075.71	670.73	334.40	200.96	1319.00	-	1.83	13790.02	
Imports	791.76	2303.19	1258.95	989.96	-	-	-	64.96	20.75	-	5307.89	
Exports	-820.39	-2262.47	-1350.24	-883.43	-	-	-	-16.58	-62.37	-0.01	-5395.47	
Stock changes	-6.83	-14.88	-16.46	-17.22	-	-	-	0.31	-	-	-55.08	
TYPES	3836.09	4442.11	-187.83	2943.72	670.73	334.40	200.96	1323.47	2.28	1.83	13847.37	
Transfers	-0.97	-230.46	259.77	-	-	-	-	-0.42	-	-	-27.82	
Statistical differences	-14.63	-0.75	11.34	2.20	-	-	-0.82	0.50	-1.24	-0.87	-2.68	
Electricity plants	-2060.04	-42.30	-192.28	-855.51	-693.14	-334.40	-158.36	-100.35	1903.83	-0.95	-2483.50	
CHP plants	-171.02	-0.01	-19.16	-303.06	-7.98	-	-2.73	-58.50	182.09	145.47	-234.52	
Heat plants	-136.72	-0.65	-11.51	-67.52	-	-	-1.16	-11.27	-0.43	180.13	-49.13	
Waste furnaces	-205.36	-	-0.21	-0.07	-	-	-	-0.06	-	-	-205.70	
Gas works	-11.18	-0.00	-2.51	4.61	-	-	-	-0.11	-	-	-9.20	
Coke/blast fuel/KB&PB plants	-65.69	-	-2.56	-0.03	-	-	-	-0.12	-	-	-88.40	
Oil refineries	-	-4188.73	4128.69	-	-	-	-	-	-	-	-60.04	
Petrochemical plants	-	34.87	-34.75	-	-	-	-	-	-	-	0.22	
Liquefaction plants	-10.10	14.34	-	-17.41	-	-	-	-	-	-	-13.18	
Other transformation	-0.37	10.70	-0.58	-12.78	-	-	-	-85.53	-	-0.85	-90.40	
Energy industry own use	-91.78	-11.51	-207.51	-293.73	-	-	-0.00	-14.28	-178.07	-36.74	-854.11	
Losses	-4.13	-8.61	-0.42	-19.28	-	-	-0.01	-0.13	-170.73	-17.75	-221.08	
TPC	1044.09	15.18	3820.49	1401.13	-	-38.37	1652.21	1737.23	271.08	9383.60		
INDUSTRY	826.39	6.07	298.63	529.81	-	0.79	192.71	730.66	124.99	2712.37		
Iron and steel	305.47	-	6.71	53.35	-	-	-	3.69	94.71	15.15	479.07	
Chemical and petrochemical	109.25	0.85	55.15	118.57	-	0.02	1.99	102.46	51.96	430.15		
Non-ferrous metals	24.54	-	5.07	16.62	-	0.00	0.10	89.88	4.00	140.21		
Non-metallic minerals	231.71	0.00	44.84	53.53	-	0.00	8.86	50.79	3.02	392.73		
Transport equipment	3.13	-	2.09	11.78	-	0.00	0.03	24.09	3.77	44.86		
Machinery	13.22	-	6.39	24.27	-	0.00	0.16	75.52	5.03	124.59		
Mining and quarrying	8.76	-	22.53	8.12	-	0.00	0.16	28.33	1.99	69.89		
Food and tobacco	30.94	0.01	10.11	44.99	-	0.00	29.42	41.83	10.56	187.86		
Paper pulp and printing	17.70	-	4.14	23.80	-	0.10	59.27	36.89	12.09	153.99		
Wood and wood products	2.88	-	2.14	3.10	-	0.00	7.84	0.00	8.75	1.75	26.56	
Construction	4.65	-	30.26	6.47	-	0.00	0.31	15.66	0.98	58.34		
Textile and leather	13.13	0.01	3.30	5.56	-	0.00	0.23	29.14	7.99	60.38		
Non-specified	61.02	9.00	196.20	156.84	-	0.80	80.96	132.82	5.81	554.75		
TRANSPORT	2.93	8.81	2490.48	97.99	-	6.89	75.99	38.99	-	2793.89		
World aviation bunkers	-	-	176.95	-	-	-	-	-	-	-	176.95	
Domestic aviation	-	-	112.71	-	-	-	-	-	-	-	112.71	
Road	-	-	1907.05	40.99	-	-	75.56	10.83	-	2034.22		
Rail	2.49	-	20.40	-	-	-	0.20	20.37	-	52.46		
Pipeline transport	-	0.01	0.33	56.34	-	-	-	2.54	-	59.22		
World marine bunkers	-	-	204.48	-	-	-	0.17	-	-	204.64		
Domestic navigation	-	-	50.72	16.10	-	-	-	-	-	66.82		
Non-specified	0.04	-	8.16	0.15	-	0.00	0.00	2.36	-	11.72		
OTHER	154.20	6.07	425.88	613.33	-	37.57	783.91	970.87	146.99	3132.22		
Residential	74.14	-	210.56	419.82	-	28.30	745.27	470.05	102.43	2050.57		
Comm. and public services	35.95	-	85.95	181.49	-	6.24	25.47	386.33	34.80	756.51		
Agriculture/forestry	15.30	0.01	104.59	9.83	-	1.48	10.08	50.64	3.08	158.49		
Fishing	0.00	-	5.60	0.10	-	0.04	0.01	0.55	0.03	6.33		
Non-specified	28.91	0.06	18.90	3.01	-	1.00	2.68	63.10	6.85	124.51		
NON-ENERGY USE	86.86	9.85	894.89	184.41	-	-	-	-	-	836.01		
In industry/transport/energy	60.62	9.85	563.73	160.41	-	-	-	-	-	734.70		
of which: chem./petrochem.	3.01	8.89	419.14	158.87	-	-	-	-	-	880.89		
In transport	-	-	9.85	-	-	-	-	-	-	9.85		
In other	0.35	-	31.11	-	-	-	-	-	-	31.46		
Electricity and Heat Output												
Electr. Generated - TWh	9538.30	147.83	842.84	5543.36	2571.37	3888.32	1191.82	528.05	-	3.96	24254.84	
Electricity plants	8935.27	147.02	750.68	4346.00	2544.63	3688.32	1192.15	309.53	-	2.65	22136.24	
CHP plants	603.03	0.01	62.16	1197.36	26.74	-	9.46	218.53	-	1.31	2118.60	
Heat Generated - PJ	5941.04	18.09	584.07	5703.41	25.82	-	401.32	940.49	8.08	87.87	13711.20	
CHP plants	1835.32	0.14	189.67	3449.38	25.82	-	14.04	577.19	0.32	44.65	6136.52	
Heat plants	4105.73	17.86	394.40	2254.02	-	-	387.28	363.30	8.76	43.32	7574.68	

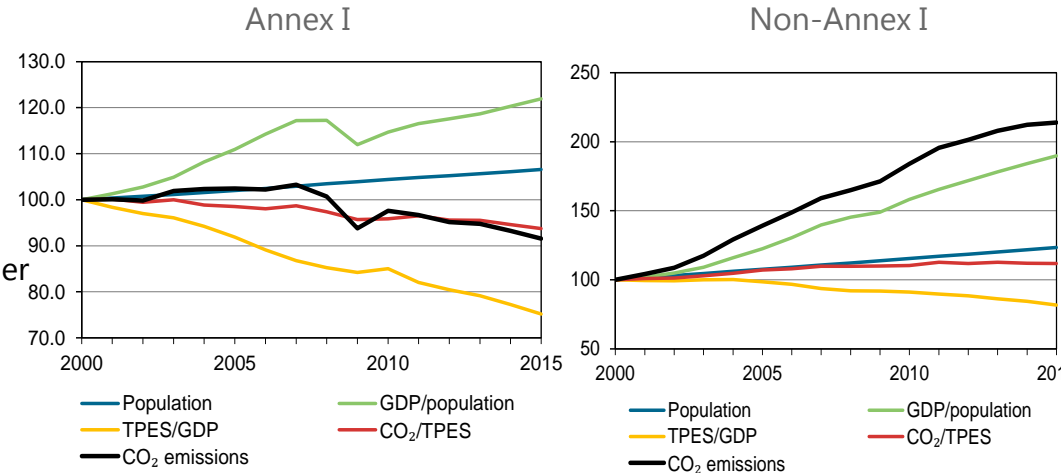
1. Includes peat and oil shale.

2. Includes crude oil, NGL, refinery feedstocks, additives and other hydrocarbons.



- Data released twice a year (April for OECD, September for the full world)
- Including a set of emission factors for electricity generation (CO₂ / kWh) for all countries covered in IEA statistics
- Free data on line and provided to COP delegates to support the discussions
- Data also used in various other IEA publications

CO₂ emissions and drivers (Kaya decomposition), 2000-2015 (2000 = 100)





International Recommendations on Energy Statistics (IRES)

- IEA leading harmonisation effort with partners
- Elaborated through very wide consultation (Oslo City Group and InterEnerStat)
- Adopted by the UN Statistical Commission in 2011
- IPCC and UNFCCC are members

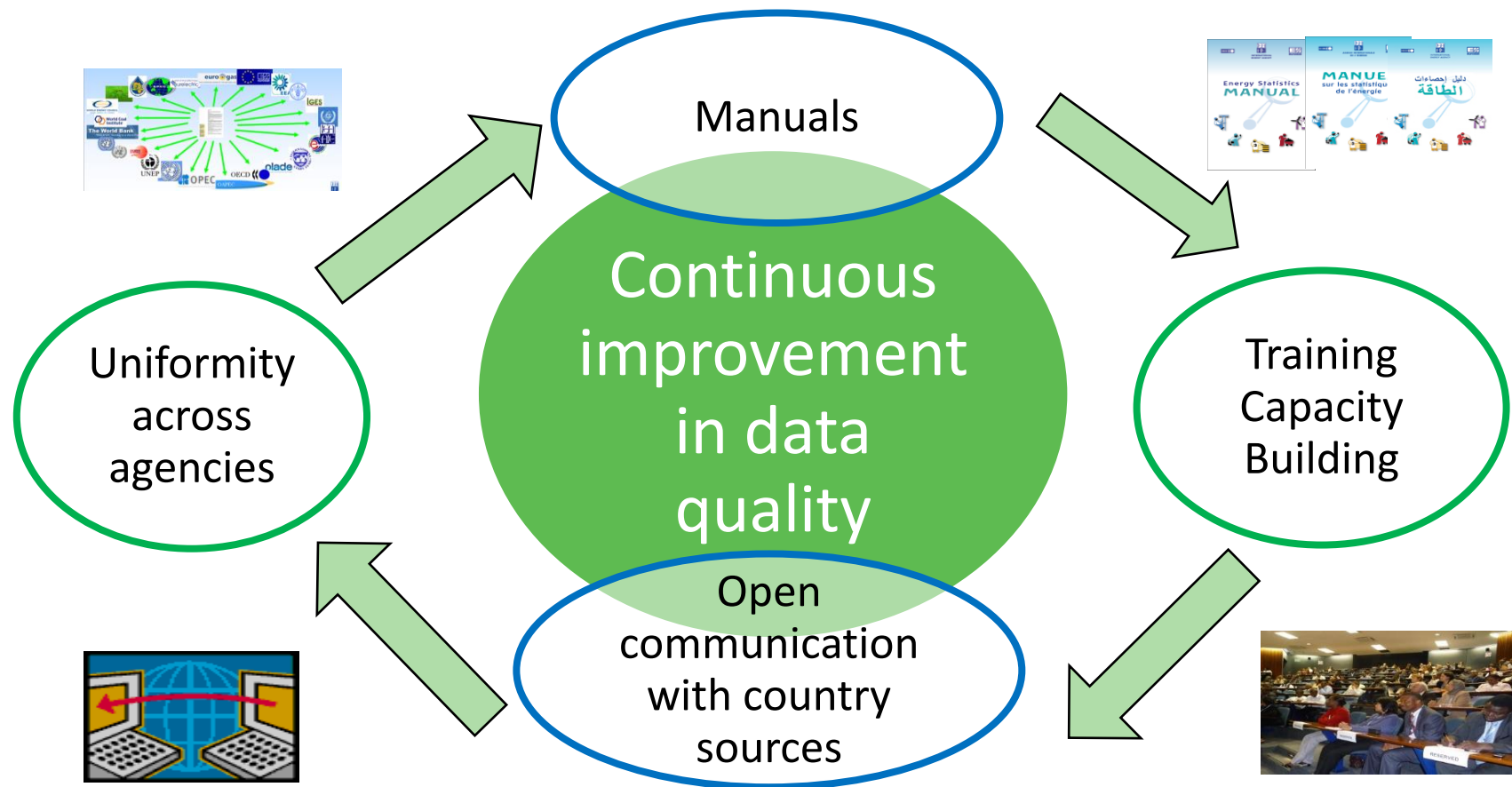
<https://unstats.un.org/UNSD/energy/ires/default.htm>

- Review of UNFCCC inventories
 - Qualitative and quantitative analyses of the discrepancies between CRF and data submitted to the IEA are provided by the IEA to the UNFCCC, for use in the official process of review of GHG inventories
- Contribution to IPCC Guidelines and broader cooperation with IPCC
 - IEA contributing author to 1996, 2006 Guidelines and 2019 Refinements for Energy
 - This joint IEA/IPCC workshop on energy data
- Collaboration with PBL/JRC (EDGAR database)
 - IEA provides energy and CO₂ emissions from fuel combustion historical data
 - PBL/JRC provides estimates of emissions from other GHGs and from other sectors

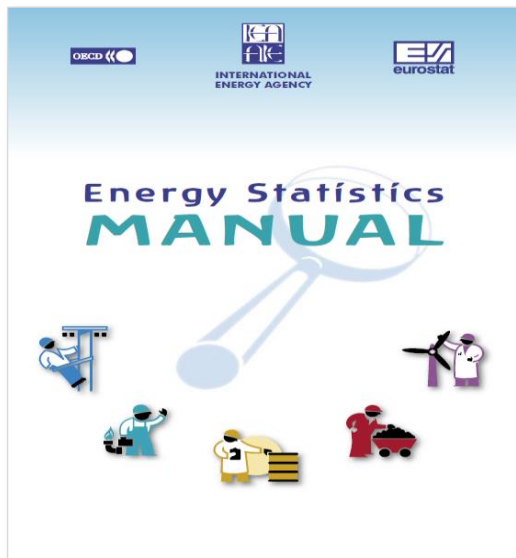


Support from the IEA

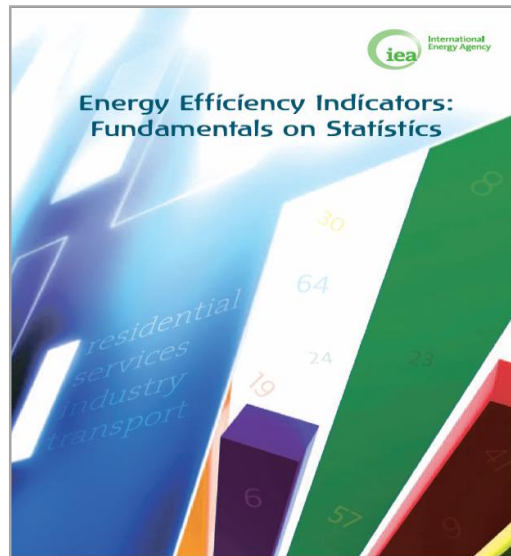
What Support Does The IEA Provide?



Energy Statistics Manuals and guidance



Available in 10 languages

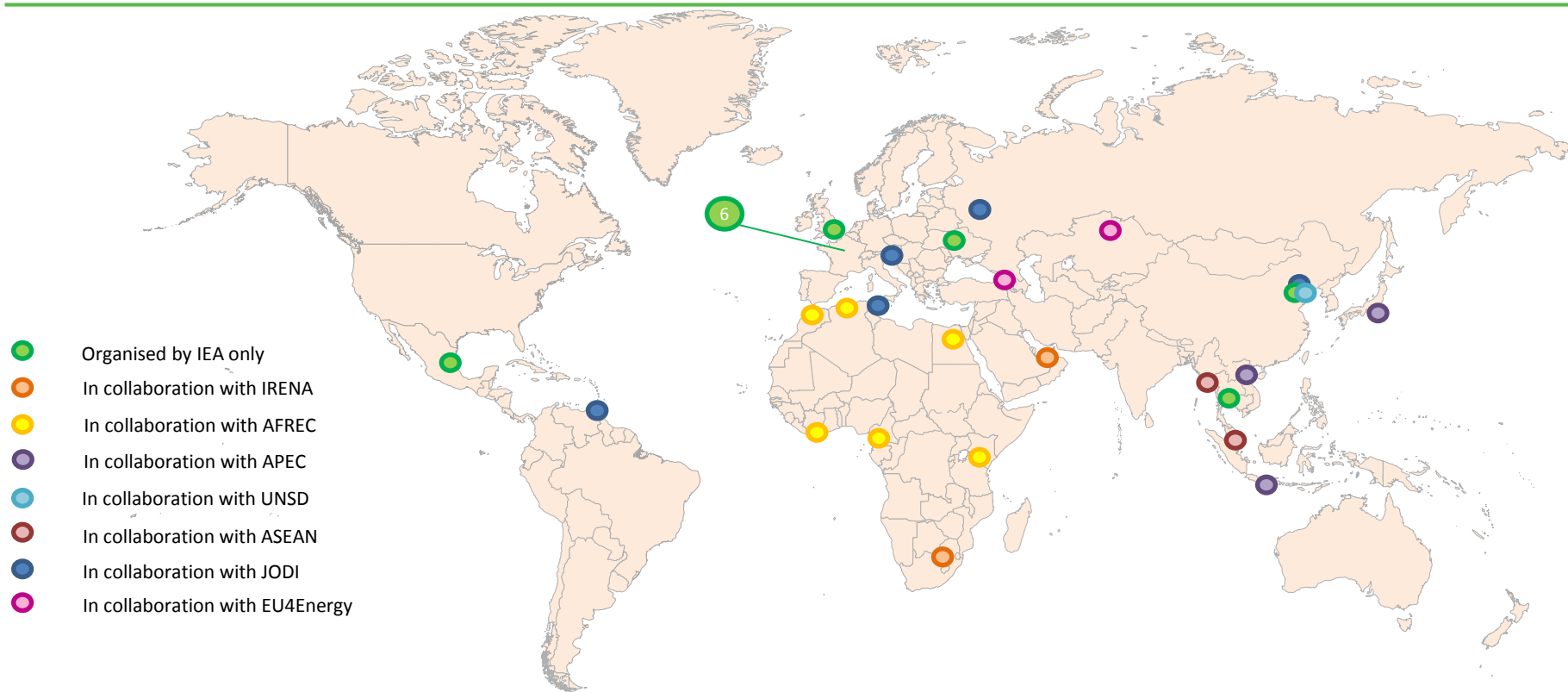


Available in 3 languages

Background	Country	Austria		R/Su/01
	Organisation	Statistics Austria		
	Name of the survey	Household energy consumption survey		
	Survey purpose	<ul style="list-style-type: none">• To determine total household energy consumption• To determine household appliances energy consumption• To collect household energy expenditure• To collect dwelling physical characteristics• To collect household occupant characteristics		
Data collection	Sample design	Stratified random sampling approach		
	Sample sources	List of addresses, list of telephone numbers, labour force survey.		
	Collection methods	<ul style="list-style-type: none">• Computer assisted personal interview (CAPI)• Computer assisted telephone interview (CATI)		
	Sample/Population size	14 000 / 3 429 720	Response rate	55%
	Frequency	Every two years	Last time surveyed	2010
	Time to complete survey	10 minutes	Mandatory	No
	Incentive	None		
	Survey respondents	Households		
Notes and comments	Elements collected	Dwelling type, dwelling floor area, building age, household occupancy, energy-related renovations, household energy consumption and related expenditures.		
	End-uses collected	Space cooling, space heating, domestic hot water, other: cooking.		
	Main challenges	<ul style="list-style-type: none">• Inconsistent responses• Response quality		
	Possible improvements			
Other documentation	Key best practice	A new approach to data control compared with previous surveys was taken for the first time in 2004 and continued in the follow-up survey runs. Up to and including the 2000 survey only the individual energy sources themselves were checked for plausibility, any missing data were calculated (quantity-value pairs) and substitutions were made if necessary. Such routines of course continue to be used, with the additional step that the total of the reported energy consumption is then related to a calculated (fictitious) overall consumption. This fictitious overall consumption by the household is calculated from the data for that household, on the one hand (floor space, number of people in household) and pre-set parameters for the individual types of use (space heating, water heating, cooking, other purposes), on the other hand. Calculating the total reported energy consumption per household in this way involves some quite complicated plausibility routines, because one or more alternative quantities have to be calculated if the quantity-value pairs do not match and these alternative quantities then, when variably applied, lead to a number of different calculated overall energy consumption figures. The fictitious standard value is then used to select the quantity-value pairs that appear most probable.		
	Other documentation	Available: Surveying Methodology and Questionnaire		

Over 170 country practices

IEA Statistics Training Events in collaboration with other organisations



The IEA has organised 12 training events and co-organised 20 others since 2015, training more than 1000 statisticians

Module	Content	Webinar	Date of release
Prices	Both on data collection and analysis of data.	Energy prices (data reporting and use)	16/08
Data analysis	Dedicated to energy analysts.	Energy efficiency	23/08
		Energy balances	06/09
		CO2	13/09
Data reporting	Primarily for our contacts to be trained in how to use the Joint Questionnaires.	Renewables	23/08
		Coal	20/09
		Electricity and heat	27/09
		Oil	04/10
		Gas	11/10

9 webinars to cover the range of energy statistics,
<http://www.iea.org/training/ieaonlinestatisticstrainingprogramme/ieaonlinestatisticsschool2017/>
 (aiming to make available in other languages (French, Spanish, Arabic, Chinese, Russian)
Over 8,000 watched on line material since summer 2016



Why do we need energy data?

- “There is a clear need for increasing co-operation among the IEA family to address global challenges effectively. Raising the quality of global energy data and statistics also depends heavily on international co-operation”. Concept paper for the 2017 IEA Ministerial meeting.
- *Ministers also noted* the prominence of the IEA as the world’s leading source of authoritative energy analysis, data and statistics *Summary of the Chair*, Mr. Ibrahim Baylan, Minister for Policy Coordination and Energy, Sweden 2017 IEA Ministerial Meeting

Energy security
Energy access
Renewables
Prices
Investment
Energy efficiency/use
RD&D
Off grid generation
Production

- Energy underpins all economic activity (output and transport)
- Need to ensure adequate security and understand risk to supply – be able to understand all flows and ability to model the future
- Provides clear understanding for investors and business
- Understanding energy use allows for efficiency, greater output at lower cost
- Required to address climate change and identify cost effective steps
- Design, monitor and evaluate policies

What flows are collected annually?

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



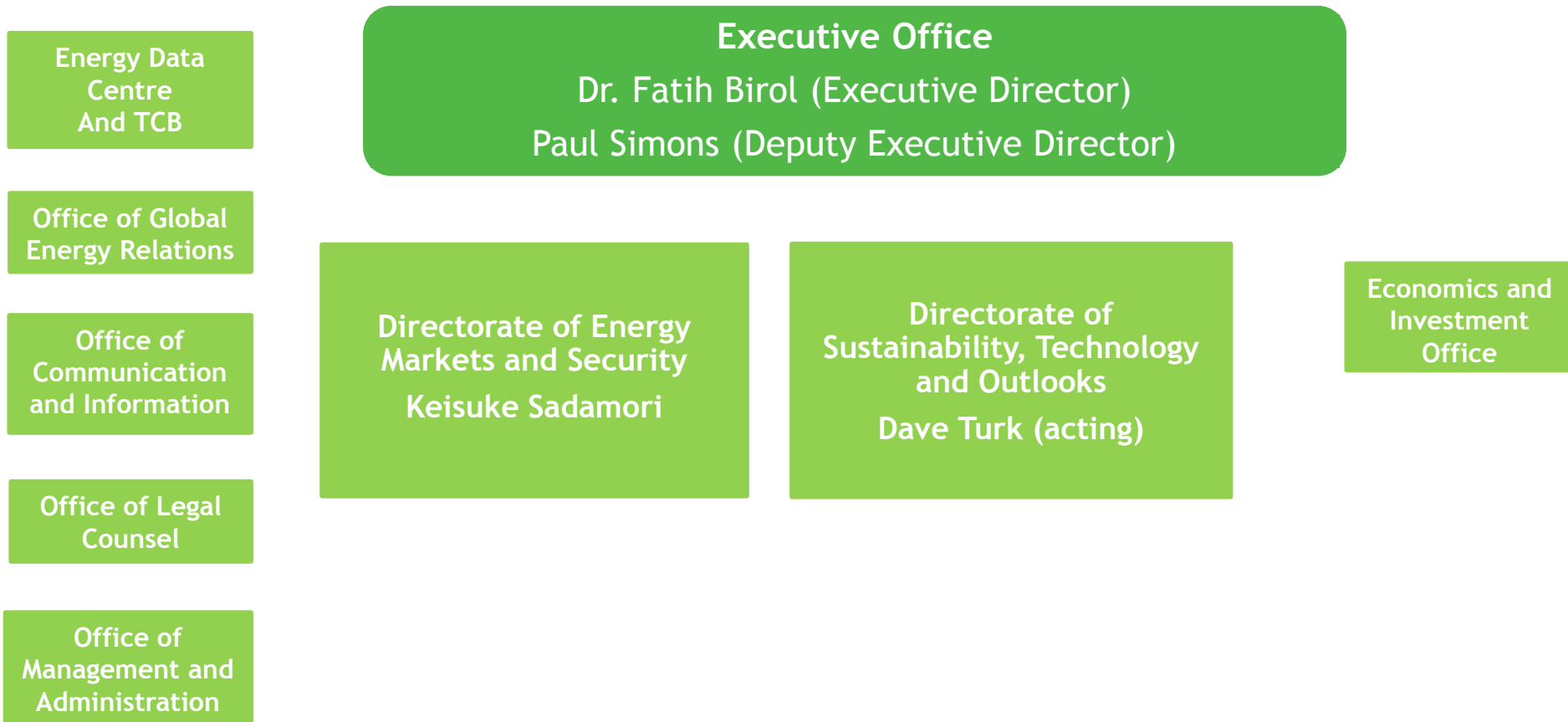
Electricity and Heat Outputs

TOTAL: 95 FLOWS

What products are collected annually?

- **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



Secretariat
Maike Fischmann

Head of Division
Duncan Millard

Desk-Top Publisher
Sharon Burghgraeve

Coal, Electricity
and Renewables

Vladimir Kubecek



Annual Coal



Annual Electricity



Annual Renewables



Short-Term Statistics
(coal, electricity)

Oil and
Natural Gas

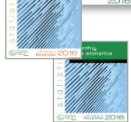
Erica Robin



Annual Oil



Annual Natural Gas



Monthly Oil
Statistics



Monthly Gas
Statistics



JODI



Oil Emergency



Gas Trade
Flow Maps

Balances, Prices &
Taxes, Efficiency
and Emissions

Roberta Quadrelli



Energy Prices
and Taxes



Energy Statistics
and Balances



SLT and R&D
Statistics



CO2 Emissions



Energy efficiency

OECD

Non-Member
Countries

Celine Rouquette



Energy Statistics and Balances
of Non-OECD Countries



Energy Statistics and Balances
of Non-OECD Countries



Energy Statistics and Balances
of Non-OECD Countries



Energy Statistics and Balances
of Non-OECD Countries

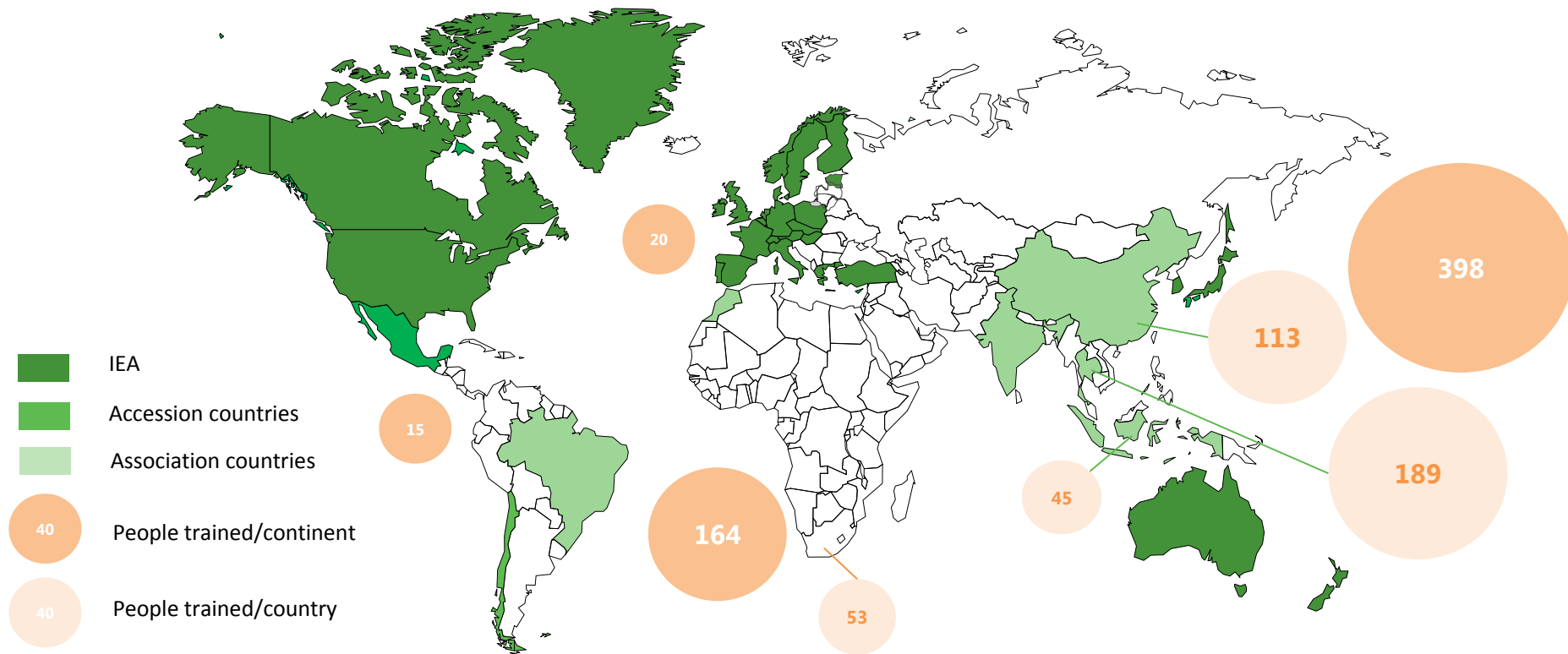


Energy Statistics and Balances
of Non-OECD Countries

Energy Statistics and Balances
of Non-OECD Countries

NMC

IEA Training and Capacity Building Overview in 2017



In 2016 the IEA directly trained 594 statisticians worldwide and over 4,000 online

- A series of prerecorded short videos addressing fundamental issues in energy statistics.
- Short clips of 90-120 seconds
- Act as a reference point for anyone looking for an explanation on a specific energy related subject
- Work underway to convert energy efficiency manuals, stats and policy , to on-line tools
- <http://www.iea.org/training/ieaonlinestatisticsprogramme/statisticstoolkitvideos/>

- What is the difference between primary and secondary energy?
- Calorific values – What is a TOE?
- What is an energy balance?
- What is the difference between TPES and TFC?
- What is energy intensity?
- Supply & Demand Breakdown
- How to calculate a weighted average?
- Transformation & energy sector own use
- What is the difference between input into transformation sector and total final consumption?

- Do not collect statistics for the sake of collecting statistics but collect only statistics which are needed
- Explore options for use of Administrative data
- Establish a legal basis
- Establish a proper reporting mechanism:
 - Questionnaires (as user friendly as possible)
 - A network of contacts
 - An agreed timetable
- Establish proper dissemination mechanism
- Allocate proper resources to collect/process the data
- Review methodology and process, to anticipate and adapt to change in the energy situation

From 4 year IEA statistics strategy, first produced in 2016

Mission

To be the premier source of worldwide energy statistics

Goals/Objectives

- To provide the statistics needed to support the mission of the Agency and all members
- To be a global reference in the methodological work on energy statistics
- To provide and further develop comprehensive global energy statistics and enhance their dissemination to inform debate and facilitate advancements in energy policy
- To improve countries ability to produce energy stats, through training and cooperation, with a particular emphasis on association countries
- Raise the profile of statistics and statisticians and highlight the relevance to policy making
- To provide opportunities for staff to develop skills and experience

- **IEA collects data from 150 countries, on a voluntary basis for all non-OECD countries**

