



Energy data transparency

- what it means for energy data including JODI

Duncan Millard – Chief Statistician, International Energy Agency

2017 EIA Conference – 27 June 2017, Washington, DC

- What is data transparency?
- The global response
- The IEA (International Energy Agency) and our work on data
- JODI

Clarity

Simplicity

Unambiguousness

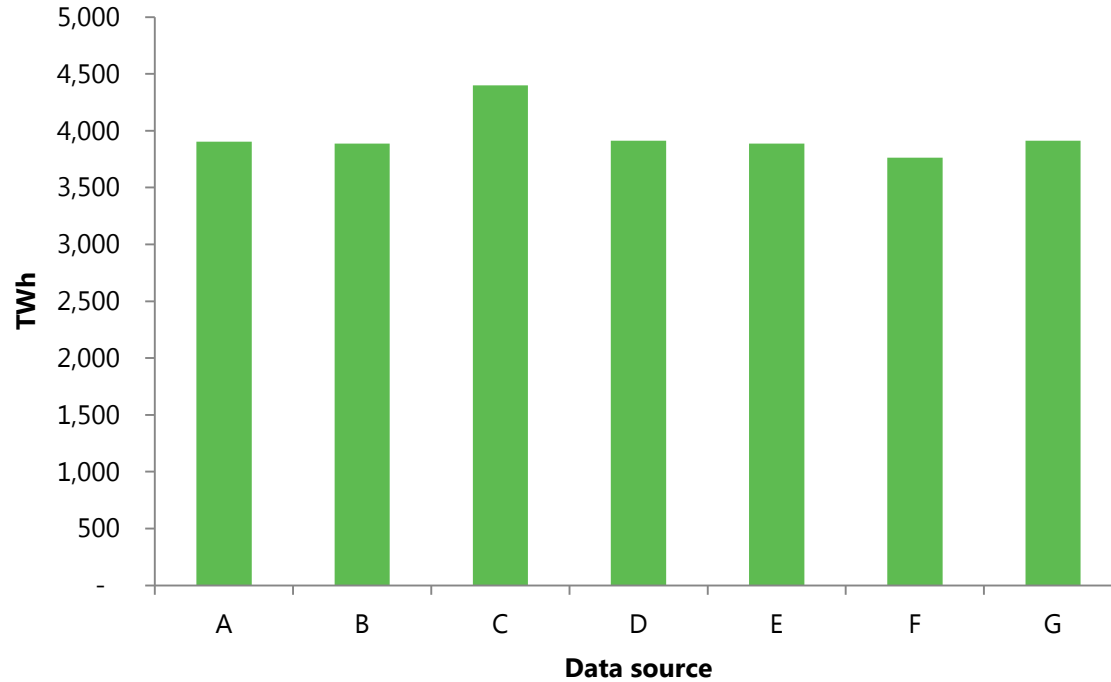
Openness

Unmistakability

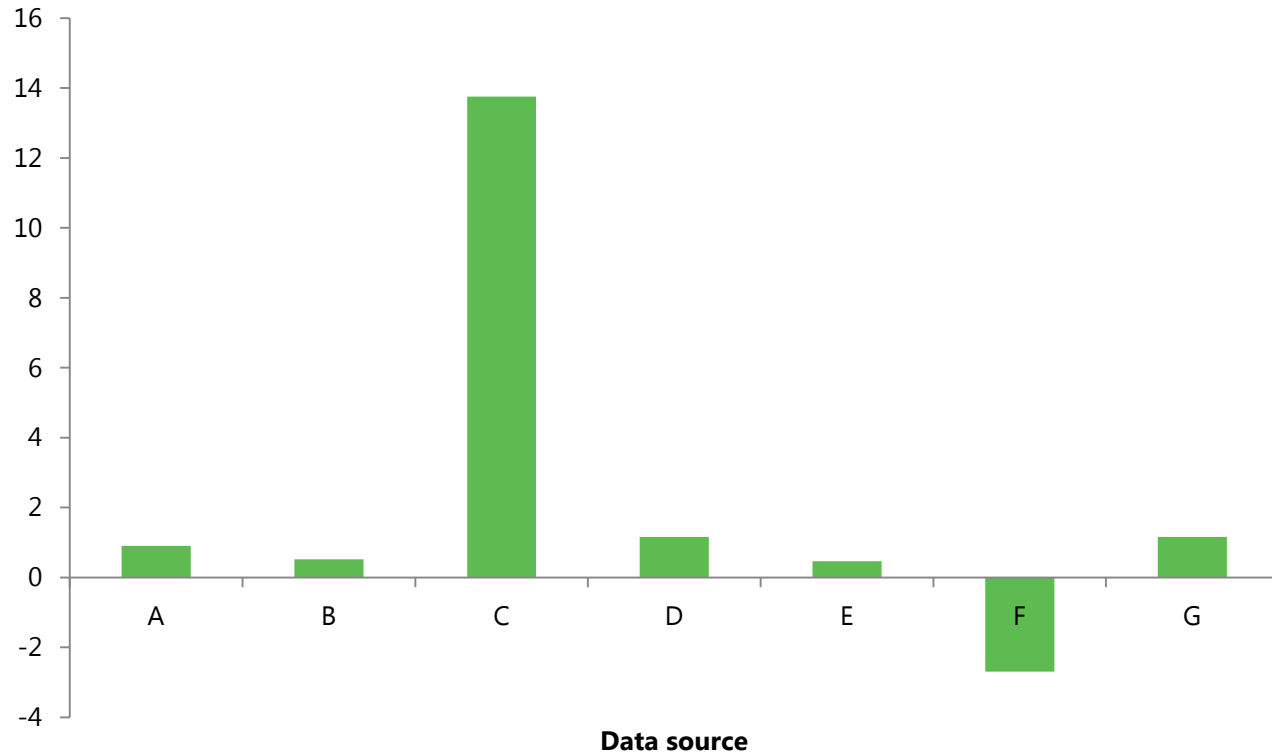
Precision

Comprehensibility

US Electricity consumption, 2014



Percentage change in US electricity consumption 2013 – 2014



“Power is nothing without control”



Data are only transparent if you know what it measures

- Geographical coverage
- Time (calendar, financial, “gas month”)
- Base (all or largest suppliers)
- Data source (admin, survey, estimate)
- Coverage (eg includes pumped storage, excludes condensates, etc)

- 2005: UN Statistical Commission recognised the need for development of energy statistics guidance, and set up the Oslo Group and InterEnerStat.
- Oslo City Group established to “contribute to the development of improved methods and international standards for national official energy statistics”. It helped draft IRES.
- InterEnerStat is a group of **over 20 international organisations**, led by the IEA working in the field of energy statistics. Has mandate to harmonize differing definitions across organisations as close as possible. It published a harmonized list of products and flows in 2010.
- Harmonised definitions at heart of IRES

- ❑ Important milestone for energy statistics as they provide:
 - ✓ **Standard International Energy product Classification (SIEC)**
 - ✓ Internationally-agreed definitions
 - ✓ Clear reference to other international classifications
 - ✓ Reference list of data items for collection
 - ✓ Recommendations for data collection and dissemination

- ❑ IRES improves comparability across products, flows and countries, so that:
 - ✓ **Countries will measure the same thing**
 - ✓ Countries will publish data in similar formats
 - ✓ Data for different products will be comparable
 - ✓ Users will understand what the statistics represent

- ❑ Transparency

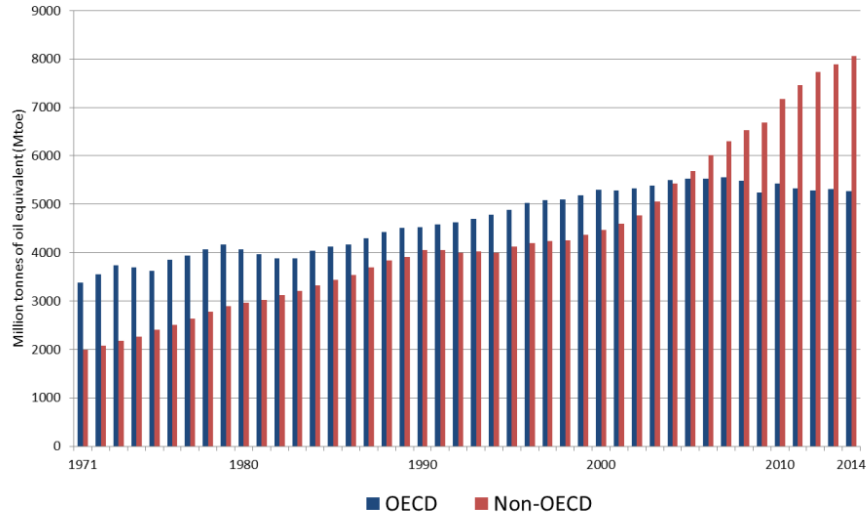
http://unstats.un.org/unsd/energy/ires/IRES_Whitecover.pdf

- **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 member countries**
 - ✓ **Asia Pacific:** Australia, Japan, Republic of Korea and New Zealand
 - ✓ **North America:** United States, Canada
 - ✓ **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 United Kingdom

 - ✓ **European Commission** also participates in the work of the IEA
 - ✓ **Chile** and **Mexico** are in the process of accession to become members of the IEA
 - ✓ **China, Indonesia, Thailand, India, Morocco and Singapore** are countries in **Association**
- **Headquarters: Paris**
- **Decision-making body: Governing Board** - Consists of member country representatives. Under the Governing Board, several committees are focusing on each area
- **Secretariat: Staff of around 260**, mainly energy experts and statisticians

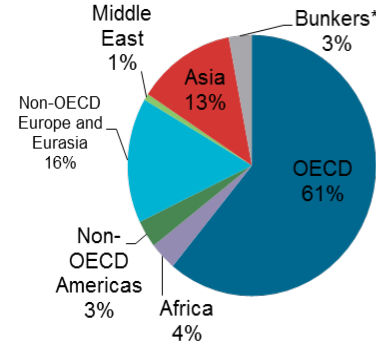
The shift in global energy

Total Primary Energy Supply



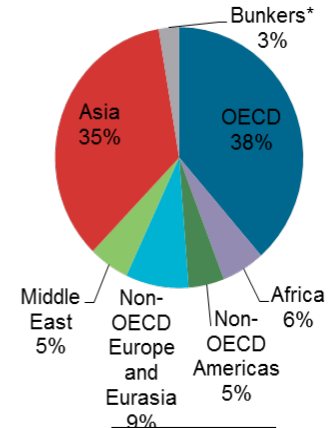
Source: IEA World Energy Balances, OECD/IEA, Paris, 2016.

1971



5 523 Mtoe

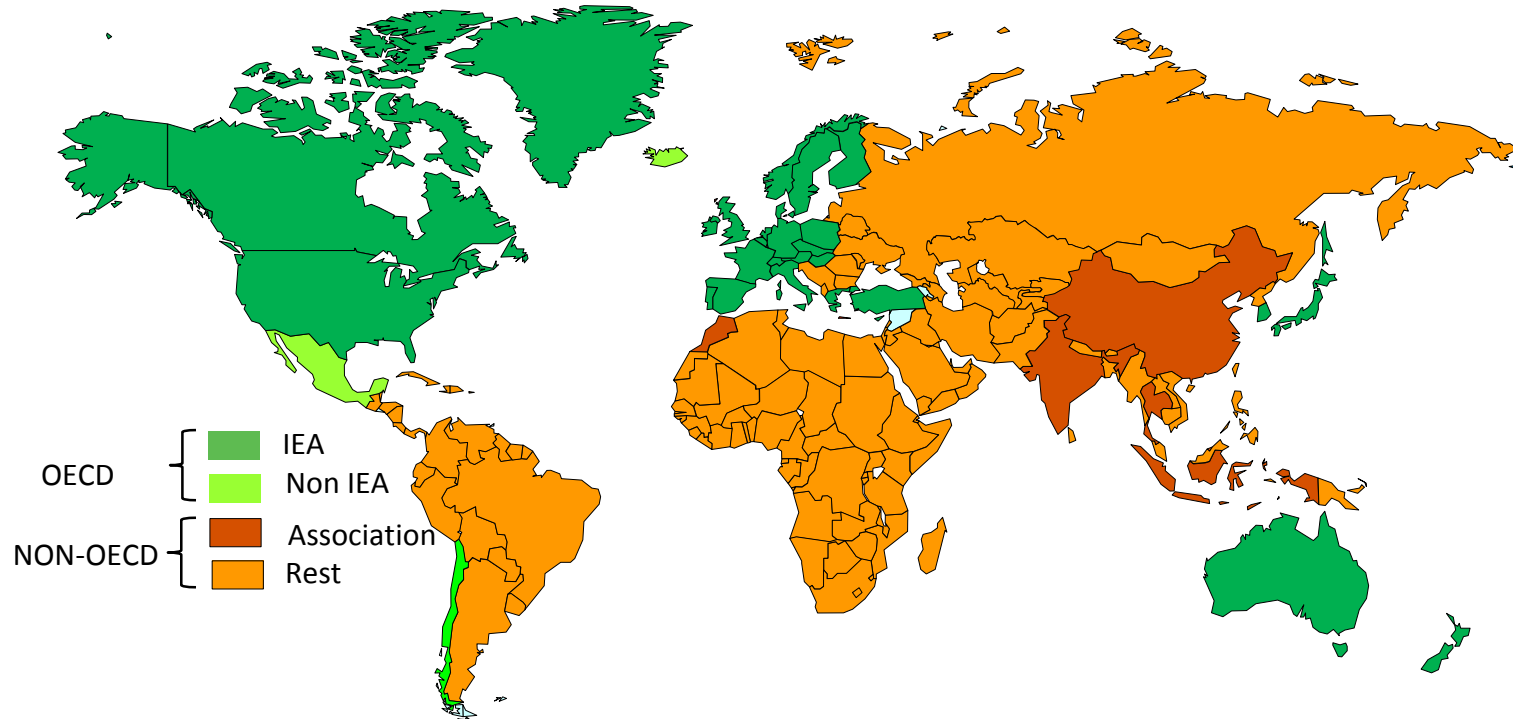
2014



13 699 Mtoe

Non-OECD countries have overtaken in 2005 in terms of share of TPES, Asia now almost equals OECD

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



OECD

- 5 annual Joint IEA/UNECE/Eurostat questionnaires
- Quarterly questionnaire on prices and taxes
- Monthly questionnaire
 - Electricity
 - Oil and gas (M-2)
 - Oil and gas (M-1)
- Emergency questionnaires



Non-OECD

- Voluntary
- Joint IEA/UNECE/Eurostat questionnaires for a few
- Network of statistics contacts in 120 countries
- Cooperation with international organisations

World energy balances



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

ENERGY BALANCES OF OECD COUNTRIES (2014 edition) - II.15

OECD Total : 2012

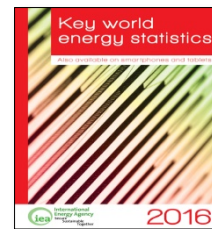
SUPPLY AND CONSUMPTION	Million tonnes of oil equivalent										
	Coal ¹	Crude oil ²	Oil products	Natural gas	Nuclear	Hydro	Geotherm. / Solar / etc.	Biofuels / Waste	Electricity	Heat	Total
Production	952.55	933.13	-	1006.80	508.71	119.47	80.00	267.86	-	0.68	3969.21
Imports	387.11	1423.56	555.42	-	-	-	-	13.95	38.24	0.00	3138.70
Exports	-319.42	-348.40	-566.58	-316.50	-	-	-	-5.80	-39.47	-0.01	-1596.18
Intl. marine bunkers	-	-	-75.58	-	-	-	-	-0.05	-	-	-75.73
Intl. aviation bunkers	-	-	-87.09	-	-	-	-	-	-	-	-87.09
Stock changes	-0.38	-5.56	2.38	4.32	-	-	-	0.04	-	-	0.90
TPE3	1019.87	2682.72	-181.66	1946.02	608.71	119.47	80.00	278.01	-1.28	0.87	6248.70
Transfers	-	-57.72	82.09	-	-	-	-	-	-	-	-24.38
Statistical differences	-9.95	2.16	-8.68	4.81	-	-	-0.05	0.09	0.47	-0.08	-11.24
Electricity plants	-727.20	-11.67	-61.68	-383.80	-505.67	-119.47	-69.63	-43.96	833.30	-0.27	-1089.06
CHP plants	-77.81	-	-13.10	-114.46	-3.04	-	-1.53	-43.36	94.18	57.33	-101.80
Heat plants	-6.07	-	-1.19	-8.22	-	-	-0.28	-6.31	-0.37	16.92	-4.53
Blast furnaces	-53.16	-	-0.44	-0.05	-	-	-	-	-	-	-53.65
Gas works	-2.17	-	-3.45	3.78	-	-	-	-0.04	-	-	-1.88
Coal/gas. fuel/BKBI/B plants	-7.45	-	-1.07	-0.00	-	-	-	-0.01	-	-	-8.54
Oil refineries	-	-2019.35	1995.20	-0.90	-	-	-	-	-	-	-25.05
Petrochemical plants	-	28.90	-29.41	-	-	-	-	-	-	-	-0.51
Liquefaction plants	-6.90	1.37	-	-3.31	-	-	-	-	-	-	-1.85
Other transformation	0.00	0.73	-	-0.79	-	-	-	-0.45	-	-0.64	-1.16
Energy industry own use	-14.63	-0.07	-99.28	-130.96	-	-	-0.00	-1.17	-68.07	-8.71	-322.89
Losses	-0.86	-	-0.01	-2.96	-	-	-0.20	-0.03	-59.28	-6.10	-69.44
TFC	120.88	7.07	1887.43	709.16	-	-	8.30	180.77	788.00	69.12	5682.48
INDUSTRY	86.61	2.93	98.89	260.92	-	-	0.80	88.98	266.86	24.04	792.92
Iron and steel	38.07	-	3.47	24.26	-	-	-	0.11	28.30	1.19	95.41
Chemical and petrochemical	10.79	2.31	17.81	57.74	-	-	0.00	2.93	38.14	10.47	139.98
Non-ferrous metals	2.04	-	1.52	10.23	-	-	0.00	0.11	24.82	0.28	39.10
Non-metallic minerals	17.74	-	14.92	24.50	-	-	0.00	4.88	13.65	0.22	76.71
Transport equipment	0.20	-	0.80	7.18	-	-	0.00	0.02	10.70	0.88	19.78
Machinery	0.34	-	3.43	17.93	-	-	0.00	0.13	35.58	0.85	58.27
Mining and quarrying	0.44	-	12.06	16.50	-	-	0.00	0.10	11.20	0.10	40.40
Food and tobacco	6.50	0.00	5.27	31.74	-	-	0.00	3.83	20.22	1.75	68.62
Paper, pulp and printing	5.65	-	3.75	19.15	-	-	0.16	43.81	24.66	3.45	100.63
Wood and wood products	0.58	-	0.63	1.61	-	-	-	5.57	3.81	0.77	12.47
Construction	2.08	-	16.19	3.74	-	-	0.00	0.30	6.43	0.05	29.29
Textile and leather	0.33	0.01	0.63	4.17	-	-	0.00	0.08	5.70	0.73	11.64
Non-specified	11.44	-	16.30	32.18	-	-	0.43	5.30	32.63	3.31	101.60
TRANSPORT	0.18	-	1107.94	24.68	-	-	-	42.86	8.97	-	1184.48
Domestic aviation	-	-	65.08	-	-	-	-	-	-	-	65.08
Road	-	-	1000.26	3.33	-	-	-	42.24	0.17	-	1046.09
Rail	0.01	-	18.63	-	-	-	-	0.22	7.07	-	25.93
Pipeline transport	-	-	0.00	21.00	-	-	-	-	0.38	-	21.39
Domestic navigation	0.15	-	22.97	0.07	-	-	-	0.33	-	-	23.51
Non-specified	-	-	0.90	0.16	-	-	-	0.06	1.35	-	2.48
OTHER	22.89	-	201.36	400.38	-	-	8.70	70.84	694.17	36.07	1273.29
Residential	14.63	-	95.03	246.28	-	-	6.83	61.14	251.82	21.63	697.36
Comm. and public services	6.63	-	55.04	145.20	-	-	1.07	6.13	296.81	11.88	482.56
Agriculture/forestry	1.35	-	41.12	6.14	-	-	0.59	2.54	10.21	0.33	62.19
Fishing	0.00	-	4.50	0.05	-	-	0.05	0.00	0.30	0.02	4.92
Non-specified	0.08	-	5.65	2.69	-	-	0.15	1.12	15.03	1.52	26.25
NON-ENERGY USE	2.99	4.74	291.46	93.91	-	-	-	-	-	-	391.89
in industry/transf.energy	2.09	4.74	279.23	33.31	-	-	-	-	-	-	318.47
of which: chem./petrochem.	0.96	4.74	207.09	33.30	-	-	-	-	-	-	246.09
In transport	-	-	7.25	-	-	-	-	-	-	-	7.25
in other	0.21	-	5.87	-	-	-	-	-	-	-	6.08
Electricity and Heat Output											
Eleo. generated - TWh	3477.84	65.84	331.87	2746.33	1961.68	1389.16	620.70	311.89	-	0.70	10784.88
Electricity plants	3184.93	55.84	282.01	2162.80	1940.37	1389.15	517.16	156.85	-	0.31	9689.14
CHP plants	293.02	-	49.65	582.50	11.21	-	3.54	155.25	-	0.39	1095.55
Heat generated - PJ	816.62	-	210.14	1389.24	4.99	-	36.21	864.01	8.82	88.98	3157.80
CHP plants	653.71	-	175.16	1093.09	4.99	-	16.69	456.95	0.36	17.63	2418.57
Heat plants	162.81	-	34.99	276.15	-	-	19.53	197.36	8.46	20.73	719.03

¹ The column of coal also includes peat and oil shale; that of crude oil includes crude oil, NGL, refinery feedstocks, additives and other hydrocarbons.

Books



Booklet



10 000 copies and over 100 000 downloads a year for the IEA Key World Energy Statistics

CDs

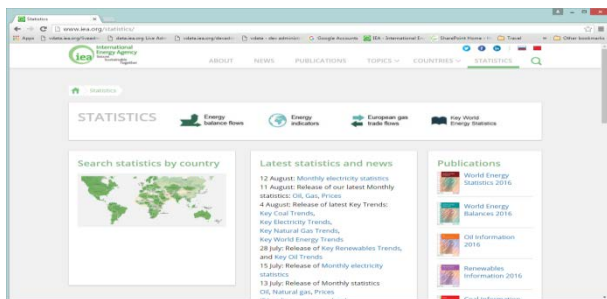


Mobile App



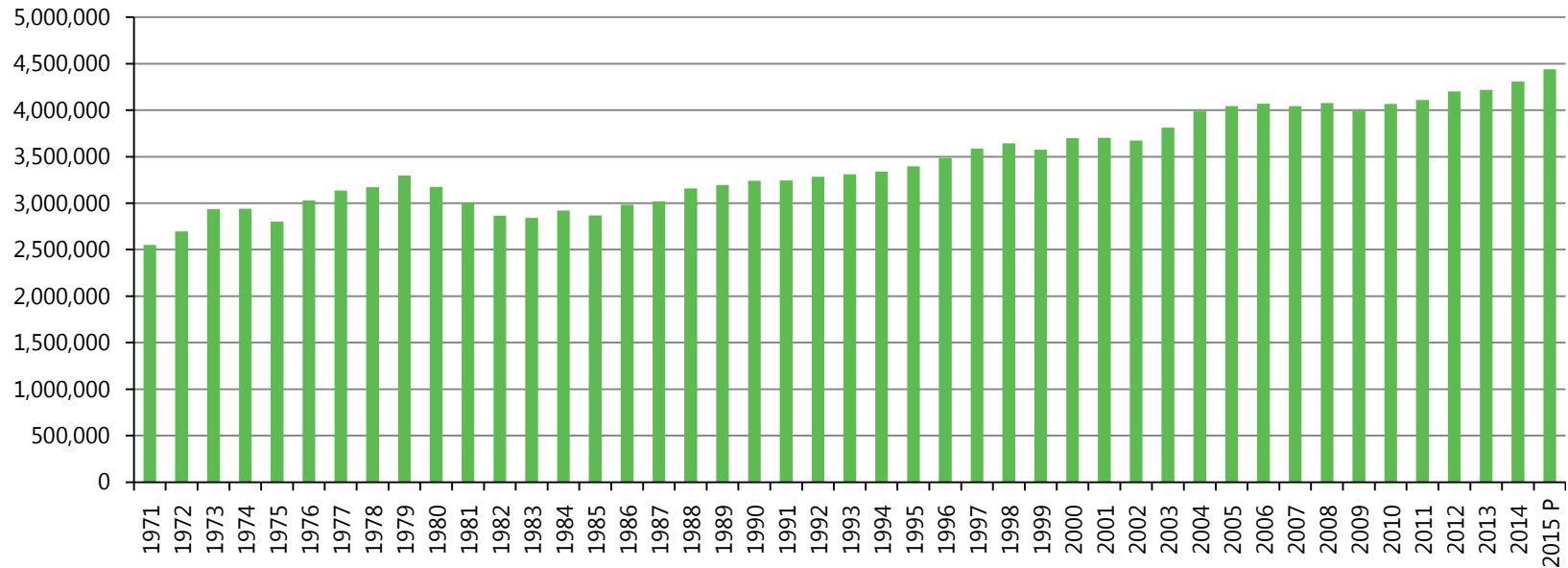
Key World Energy Statistics available in iPhone, iPad, Android and Windows Phone applications

On-line



The statistics web page is by far the most visited page of the IEA website

Global Production of Crude, NGL, Feedstocks (ktoe)



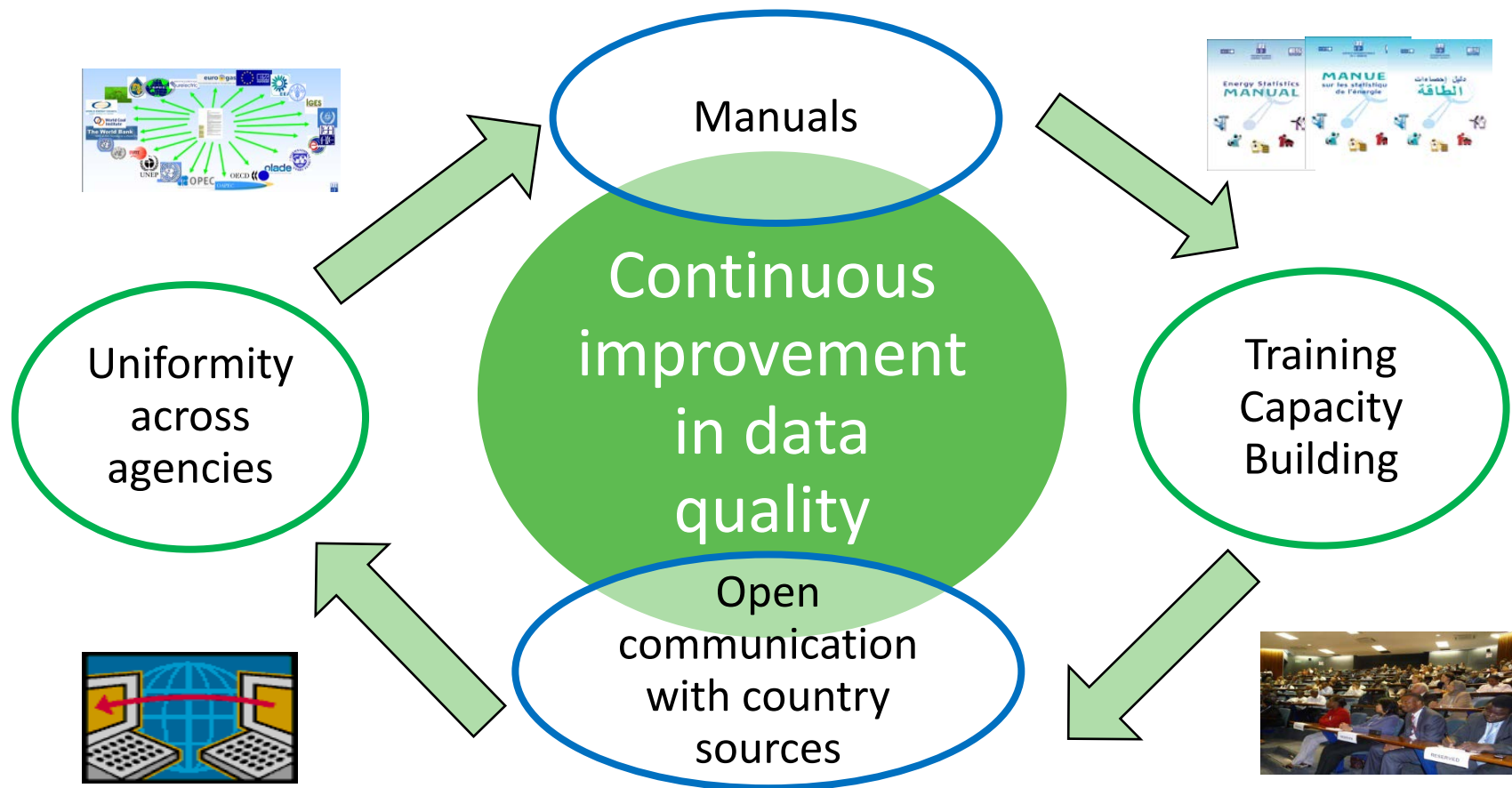
http://www.iea.org/media/statistics/IEA_HeadlineEnergyData_2016.xlsx

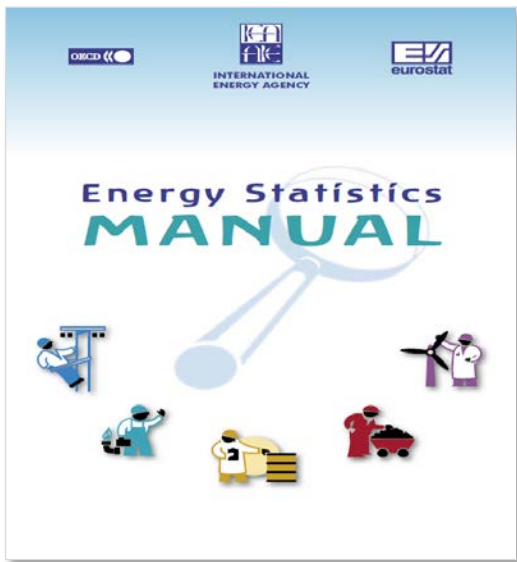
Meta-data



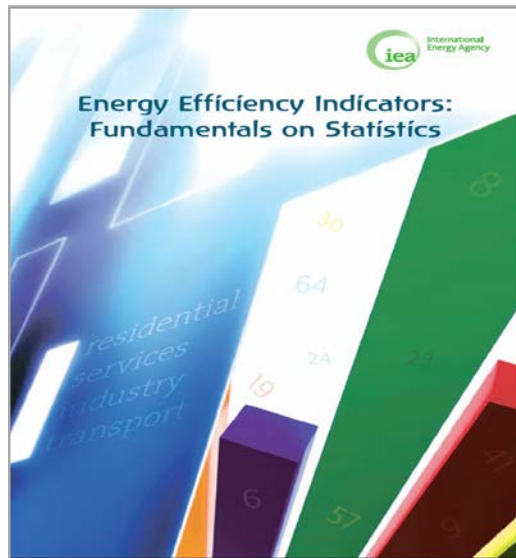
Coal, peat and oil shale	Coal includes all coal, both primary (including hard coal and lignite) and derived fuels (including patent fuel, coke oven coke, gas coke, BKB, gas works gas, coke oven gas, blast furnace gas and other recovered gases). Peat (including peat products) and oil shale are also included in this figure where applicable.
Crude, NGL and feedstocks	Crude oil comprises crude oil, natural gas liquids, refinery feedstocks and additives as well as other hydrocarbons (including emulsified oils, synthetic crude oil, mineral oils extracted from bituminous minerals such as oil shale, bituminous sand, etc. and oils from coal and gas liquefaction).
Oil products	Oil products comprise refinery gas, ethane, LPG, aviation gasoline, motor gasoline, jet fuels, kerosene, gas/diesel oil, fuel oil, naphtha, white spirit, lubricants, bitumen, paraffin waxes, petroleum coke and other oil products.
Natural gas	Natural gas includes both 'associated' and 'non-associated' gas as well as colliery gas (excluding natural gas liquids).
Nuclear	Nuclear shows the primary heat equivalent of the electricity produced by a nuclear power plant with an average thermal efficiency of 33%.
Renewables and waste	Renewables and waste comprises hydro, geothermal, solar, wind and tide/wave/ocean energy and the use of these energy forms for electricity and heat generation, as well as solid biofuels, liquid biofuels, biogases, industrial waste and municipal waste. Unless the actual efficiency of the geothermal process is known, the quantity of geothermal energy entering electricity generation is inferred from the electricity production at geothermal plants assuming an average thermal efficiency of 10%. Similarly, for solar thermal electricity, a default of 33% is used if the actual efficiency is not known. For solar PV, wind and tide/wave/ocean energy, the quantities entering electricity generation are equal to the electrical energy generated
Electricity	Electricity shows final consumption and trade in electricity, which is accounted at the same heat value as electricity in final consumption (i.e. 1 GWh = 0.000086 Mtoe).
Heat	Heat shows the disposition of heat produced for sale. The large majority of the heat included in this column results from the combustion of fuels although some small amounts are produced from electrically powered heat pumps and boilers. Any heat extracted from ambient air by heat pumps is shown as production.
Total	Total equals the total of products included in the dataset.

What Support Does The IEA Provide?





Available in 10 languages

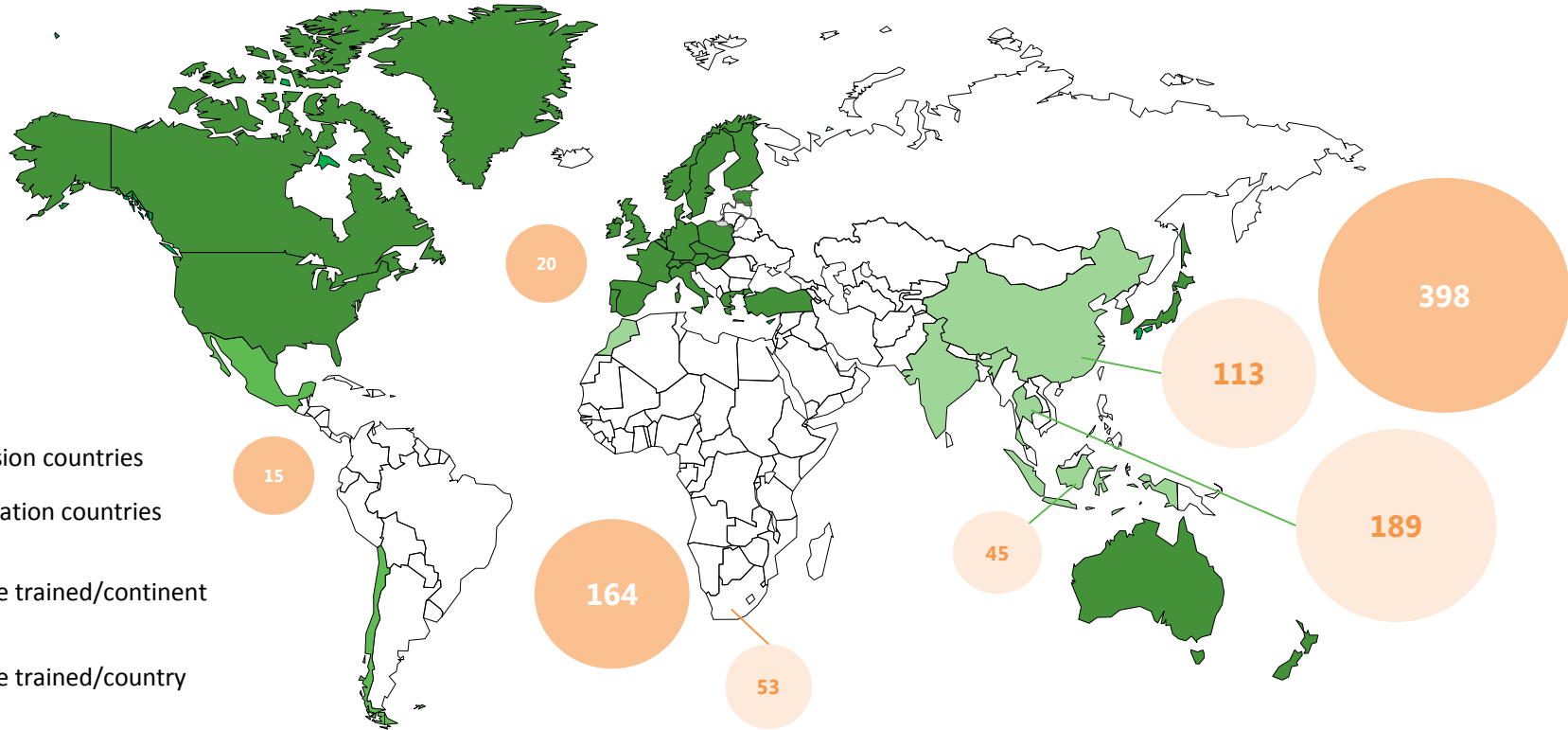


Available in 3 languages

		R/S/01
Background	Country	Austria
	Organization	Statistics Austria
Background	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
	Sample design	Stratified random sampling approach
	Sample sources	List of addresses, list of telephone numbers, labour force survey
Data collection	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
	Frequency	Every two years
	Time to complete survey	10 minutes
	Incentive	None
	Survey respondents	Households
Data collection	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.
Notes and comments	Main challenges	<ul style="list-style-type: none"> Inconsistent responses Response quality
	Possible improvements	
	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 Training and Capacity Building Overview in 2016



The IEA has trained 594 statisticians worldwide in 2016

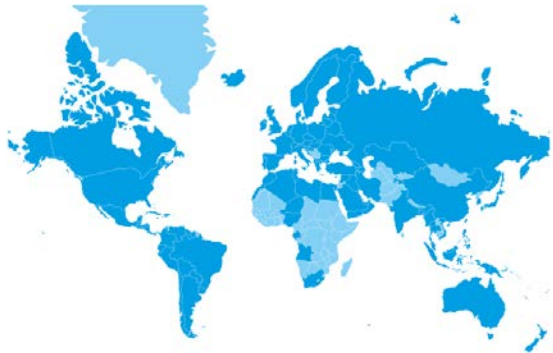
JODI (Joint Organisation data Initiative)



- Free Official Global monthly oil and gas data
- Collected on common questionnaire
- Consistent methodology help make data useful
- Extensive coverage



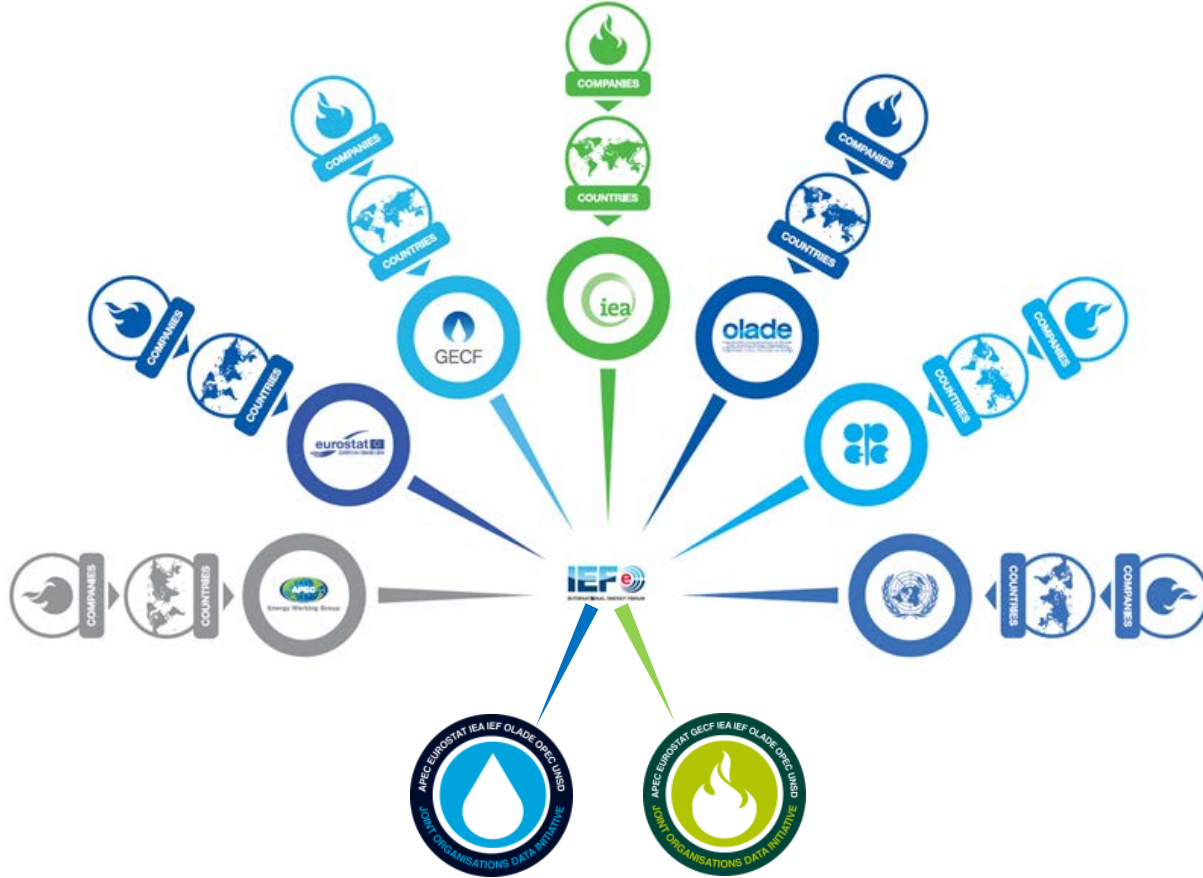
JodiOil 



JodiGas 



How JODI works



JODI World databases

- National
 - Company/Industry – combine data and submit to national administration
 - Administration level - evaluate submitted data, may estimate missing/incomplete information, aggregate at a national level, submit to international organization

- Organisation
 - Internal consistency checks for complete submissions, Checking of data: balance, outliers etc. Comparison with external data when available, Interaction with administrations
 - Provide support for technical and methodological issues
 - Encourage complete submissions, Encourage revisions when data become final
 - Training and capacity building
 - Send data to IEF for final validation and publication

- IEF
 - Publish data on website

- Extensive coverage
 - JODI Oil
 - 110+ countries
 - Around 90% of global supply and demand
 - JODI Gas
 - 80+ countries
 - Around 80 % of global supply and demand
- Free Official data
 - Data published is as submitted (after data quality exchanges)
 - Metadata included
 - No estimation for missing information (at organizational level)
- Centralized/harmonized dissemination
 - Published time table of updates

Downloadable from <https://www.jodidata.org/>

Joint Organisations Data Initiative (Read-only)													
Unit: Thousand Barrels per day (kb/d)	Product: Crude oil BALANCE: Production												
TIME	Mar2016	Apr2016	May2016	Jun2016	Jul2016	Aug2016	Sep2016	Oct2016	Nov2016	Dec2016	Jan2017	Feb2017	Mar2017
Country													
Albania	0	0	0	0	0	0	0	0	0	0	0	0	0
Algeria	1,150	1,154	1,146	1,117	1,158	1,172	1,196	1,184	1,198	1,162	1,091	1,084	0
Angola	1,782	1,733	1,707	1,752	1,761	1,747	1,649	1,507	1,688	1,639	1,615	1,649	1,652
Argentina	522	521	499	501	500	516	542	507	499	492	487	0	0
Armenia	0	0	0	0	0	0	0	0	0	0	0	0	0
Australia	295	287	271	284	307	297	294	294	290	270	258	255	273
Austria	18	13	14	19	14	15	15	14	15	14	15	15	17
Azerbaijan	810	796	794	808	807	774	709	759	678	730	743	729	694
Bahrain	51	50	48	50	48	49	48	48	50	47	46	46	45
Bangladesh	0	0	0	0	0	0	0	0	0	0	0	0	0
Barbados	1	1	1	0	0	0	0	0	0	0	0	0	0
Belarus	33	32	34	34	33	33	33	33	33	33	33	34	33
Belgium	0	0	0	0	0	0	0	0	0	0	0	0	0
Belize	0	0	0	0	0	0	0	0	0	0	0	0	0
Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0
Bolivia	0	0	0	0	0	0	0	0	0	0	0	0	0
Brazil	2,267	2,296	2,493	2,564	2,586	2,615	2,677	2,630	2,614	2,736	2,692	2,681	0
Brunei Darussalam	113	91	107	105	100	85	115	125	116	100	106	123	113
Bulgaria	0	0	0	0	0	0	0	0	0	0	0	0	0
Canada	3,131	3,159	2,771	2,846	3,110	3,146	3,130	3,122	3,278	3,206	3,328	3,389	3,159
Chile	5	4	4	4	4	4	4	4	4	4	3	4	4
China	4,102	4,048	3,984	4,046	3,949	3,884	3,898	3,790	3,926	3,960	3,901	3,901	3,914
Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0
Colombia	817	815	806	888	843	827	869	0	0	0	0	0	0

- Colour coding (data comparability assessment depends on JODI partner organisation)

Blue = Good

Yellow = Consult metadata/Use with caution

White = Not assessed

Importance of Metadata

Country	TIME	Oct2016	Nov2016	Dec2016	Jan2017	Feb2017	Mar2017
Country A		4	2	4	4	6	3
Country B		9	9	8	8	8	7
Country C		5	2	4	5	5	3
...		0	0	0	0	0	0
		0	0	n	n	n	n
		7	10				
		14	13				
		0	0				
		0	0				
		0	0				
		94	85				
		0	0				
		3	3				
Country X		29	37				
		7	5				
		1,144	1,200				
		26	31				
		20	21				
		0	0				
		7	10				
		0	0				
		0	0				
		7	11				
		2	3				
		0	0				
		9	10				
		15	15				

Item Code: COUNTRY X
Default Label: Country X

Notes:

[Organisation(s) to which the country reports and Organisation from which the JODI-Oil World Database takes data]
 Country X reports to APEC and the IEA in metric tons.
 The JODI-Oil World Database takes data from the IEA.

[Reporting unit and mass/volume unit conversion factors]
 The original data are reported in metric tons and then converted to volume units (kbbbl/d, kbbbl, and kl) by applying conv country. The conversion factors for Other oil products are estimated based on standard conversion factors and share of Total oil products in units other than the original mass unit (metric tons) are calculated as the sum of converted data for Kerosenes, Gas/diesel oil, Fuel oil and Other oil products.

[JODI-Oil participation assessment (Smiley face) and Colour code assessment approach]
 Please visit www.jodidata.org/oil/participants/participation-assessment.aspx to view the latest assessment.
 A detailed colour code assessment approach by IEA is available at <http://www.jodidata.org/oil/support/user-guide/assessments/colour-code-assessment-approach-by-iea.aspx>

[Country specific notes]

[Outstanding data issues]

Challenges



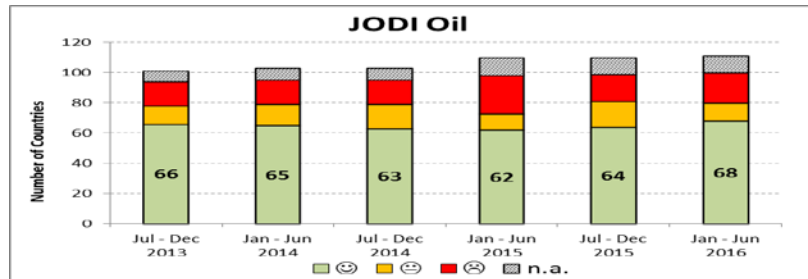
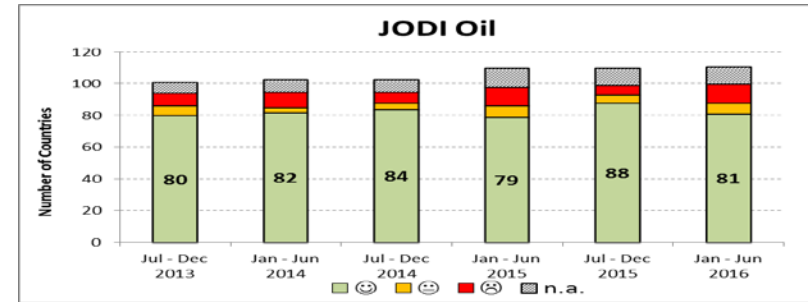
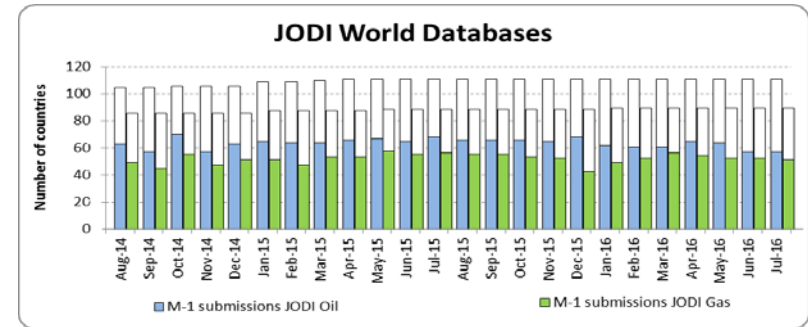
- Timeliness and Challenging M-1 deadline
 - 25th of the month following reference month
 - Multiple players involved in collection
 - Time needed for checking and processing

Sustainability

- JODI needs regular monthly reporting
- Some countries miss certain months
- Some countries submit later (quarterly or annually)

Completeness and confidentiality

- Availability of monthly data in countries
- Submission of revisions with more complete data
- Issues of confidentiality
 - Legislative issues/authorisation
 - Perceived as commercially sensitive information



JODI

- Short term preliminary data
- Monthly M-1
- Key data Supply Side
- Seasonality analysis

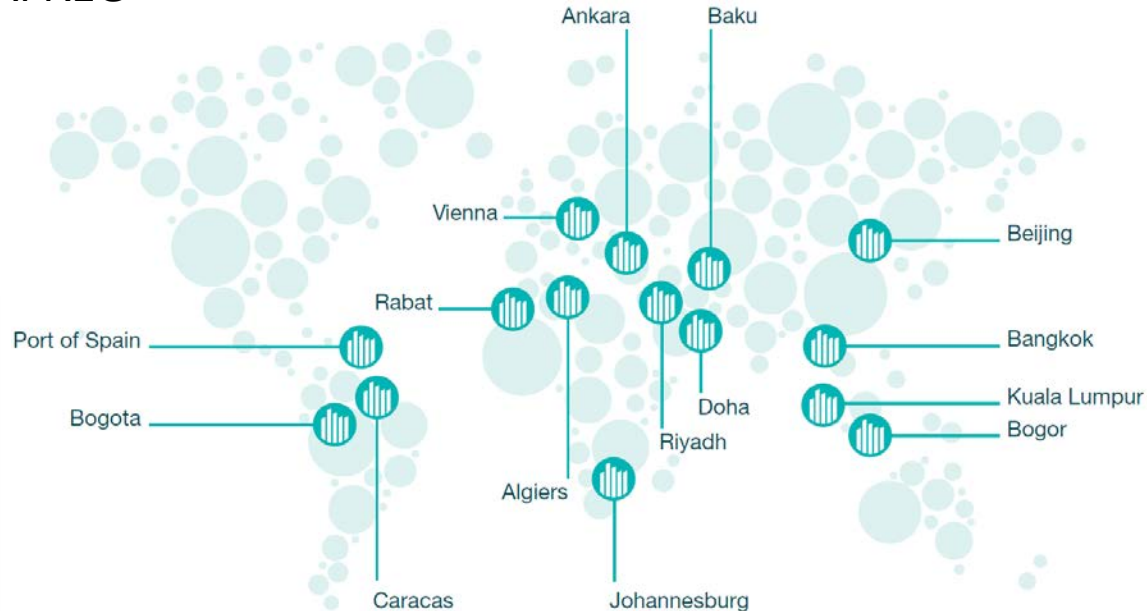
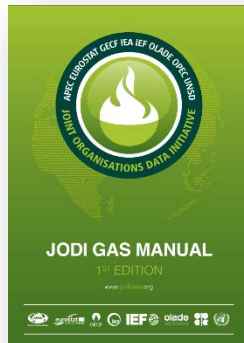
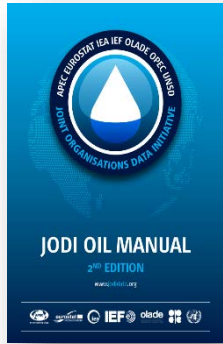
Annual data

- Final annual data
- Annual Y-2
- Supply and Demand
- Higher level of detail

- JODI

- JODI are short-term data
- Early key data for over 90 countries provide basis for early analysis of markets
- Revisions will happen
- Sum of 12 months not (necessarily) comparable to annual data
- Trends and levels

- JODI Training Workshops
 - 16 workshops delivered by JODI Partners around the globe since 2006, training more than 500 professionals
- Last workshops in April 2017 in Tunisia with 50 participants from 30 African countries in cooperation with AFREC
- Manuals



- During 2016
 - 3 new countries in the JODI Oil DB (Albania, Moldova and Nepal => 114 countries)
 - 4 new countries in the JODI Gas DB (Albania, Colombia, Moldova and UAE => 85 countries)
 - Smiley faces for JODI Gas officially published in 2016 – high level quality assessment
 - JODI Heads of organization meetings ahead of IEF ministerial (Algiers, September 2016)
 - Regular update of the JODI 5-Year Action Plan toward 2020
 - JODI User seminar held in London in February 2016 (previous one in Geneva, June 2015)
 - Share knowledge – via JODI Forum – on data issues for all users
- Next steps
 - Increasing visibility – access via data redistribution platforms
 - JODI Conference planned for 4Q2017 in UK
- Focus on improving oil and gas data
 - Participation
 - Timeliness
 - Completeness
 - Market coverage

JODI Gas – Smiley faces

Algeria	☹️	😞	😐	France	☹️	😞	😐	Oman	n.a.	n.a.	n.a.
Argentina	n.a.	n.a.	n.a.	Georgia	☹️	😞	😐	Papua New Guinea	n.a.	n.a.	n.a.
Australia	☹️	😞	😐	Germany	☹️	😞	😐	Peru	😞	😞	😐
Austria	☹️	😞	😐	Greece	☹️	😞	😐	Philippines	☹️	😞	😐
Azerbaijan	☹️	😞	😐	Hong Kong, China	☹️	😞	😐	Poland	☹️	😞	😐
Bahrain	☹️	😞	😐	Hungary	☹️	😞	😐	Portugal	☹️	😞	😐
Bangladesh	n.a.	n.a.	n.a.	India	☹️	😞	😐	Qatar	n.a.	n.a.	n.a.
Barbados	☹️	😞	😐	Indonesia	☹️	😞	😐	Romania	☹️	😞	😐
Belarus	☹️	😞	😐	Iran	☹️	😞	😐	Russian Federation	☹️	😞	😐
Belgium	☹️	😞	😐	Iraq	☹️	😞	😐	Singapore	☹️	😞	😐
Belize	n.a.	n.a.	n.a.	Ireland	☹️	😞	😐	Slovak Republic	☹️	😞	😐
Bolivia	☹️	😞	😐	Italy	☹️	😞	😐	Slovenia	☹️	😞	😐
Brazil	☹️	😞	😐	Japan	☹️	😞	😐	South Africa	☹️	😞	😐
Brunei Darussalam	☹️	😞	😐	Korea	☹️	😞	😐	Spain	☹️	😞	😐
Bulgaria	☹️	😞	😐	Kuwait	☹️	😞	😐	Sweden	☹️	😞	😐
Canada	☹️	😞	😐	Latvia	☹️	😞	😐	Switzerland	☹️	😞	😐
Chile	☹️	😞	😐	Libya	☹️	😞	😐	Taiwan, China	☹️	😞	😐
China	☹️	😞	😐	Lithuania	☹️	😞	😐	Thailand	☹️	😞	😐
Colombia	☹️	😞	😐	Luxembourg	☹️	😞	😐	Trinidad & Tobago	☹️	😞	😐
Croatia	☹️	😞	😐	FYR of Macedonia	☹️	😞	😐	Tunisia	☹️	😞	😐
Czech Republic	☹️	😞	😐	Malaysia	☹️	😞	😐	Turkey	☹️	😞	😐
Denmark	☹️	😞	😐	Mexico	☹️	😞	😐	Ukraine	☹️	😞	😐
Dominican Republic	☹️	😞	😐	Moldova	☹️	😞	😐	United Arab Emirates	☹️	😞	😐
Ecuador	☹️	😞	😐	Morocco	☹️	😞	😐	United Kingdom	☹️	😞	😐
Egypt	☹️	😞	😐	Myanmar	☹️	😞	😐	United States	☹️	😞	😐
Equatorial Guinea	n.a.	n.a.	n.a.	Netherlands	☹️	😞	😐	Uruguay	☹️	😞	😐
Estonia	☹️	😞	😐	New Zealand	☹️	😞	😐	Venezuela	☹️	😞	😐
Finland	☹️	😞	😐	Norway	☹️	😞	😐	Vietnam	n.a.	n.a.	n.a.

- Not all data are equal
- The more we want and need to use data – the more we need to understand it
- The IEA and all our partners in JODI are working to enhance real data transparency and consistency in energy data



Thank you – look forward to questions