UNITED NATIONS STATISTICS DIVISION

Energy Statistics *Newsletter*

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ENERGY STATISTICS COMPILERS MANUAL

The Energy Statistics Compilers Manual (ESCM) has been developed in accordance with the decisions of the United Nations Statistical Commission at its 42nd session as part of the implementation process of the International Recommendations for Energy Statistics (IRES).

The ESCM contains further and more detailed explanations of the recommendations and provides practical guidance for compilers of energy statistics and energy balances by describing country practices. The ESCM has been prepared by UNSD in close collaboration with the Oslo Group on Energy Statistics.

It is foreseen that the Manual will be periodically reviewed and updated to reflect new methodological developments and keep data compilers abreast of new country practices. As part of the preparation of the Manual, country practices have been collected through a country practice template and other means. These examples of country practices significantly increase the value of the ESCM, as they provide more guidance to countries on the implementation of various aspects of the IRES by illustrating functioning examples of implementation and adaptation. It is expected that the list of country examples will be expanded continuously, keeping the ESCM up-to-date with new developments and techniques.

To download the white cover publication of the ESCM go to: https://unstats.un.org/unsd/energy/ESCM.htm.

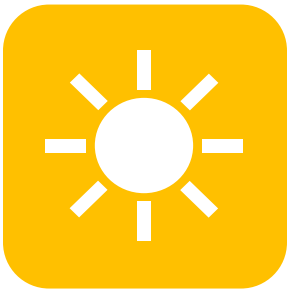
SERIES: EXAMPLES FROM THE ENERGY STATISTICS COMPILERS MANUAL

PRIMARY EQUIVALENT FOR DIRECT RESIDENTIAL USE OF SOLAR HEAT IN BRAZIL

João Antonio Moreira Patusco, Ministry of Mines and Energy, Brazil

In 2005, the Brazilian Electricity Efficiency Programme (PROCEL) carried out a study that showed that 24% of residential electricity use was employed in water heating. A decade later, in 2015, a study update saw this percentage lowering to 15%, due mainly to the increased use of personal computers, television sets, and other electronic appliances. This result was used by the Brazilian Ministry of Mines and Energy (MME) to help decide between methods to assess direct use of solar heat in households.

Brazil has approximately 12 million m^2 of solar heat collectors, with 80% being used for residential water heating and 20% for swimming pool heating and other finalities. Considering 3 m^2 of collectors per household, 3.2 million households (4.7% of the total [1]) are estimated to use solar heating.



MME considered two methods for assessing direct residential use of solar heat: 1) Assessing the avoided electricity consumption (gauging the consumption side); and 2) Applying solar collector suppliers' technical specifications to gauge production.

The first method employs the figure of 100 kWh annual electricity consumption avoided per square meter of solar heat collectors, based on empirical studies carried out by MME. The second method assumes that 500 kWh are generated in a year by each square meter of solar heat collectors, based on the range

	Unit	Avoided electricity consumption	Suppliers' specifications
Parameters			
Total solar collector area	'000 m^2	12,000	12,000
Total residential solar collector area (80%)	'000 m^2	9,600	9,600
Solar collector area per household	m^2	3	3
Households with solar collectors	'000	3,200	3,200
Total number of households	'000	68,000	68,000
Average electricity consumption per household	kWh	1,930	1,930
Residential electricity consumption used for heating	%	15	15
Households with solar collectors			
Households with solar collectors (% of total)	%	4.7	4.7
Direct use of solar heat per collector area	kWh/m^2	**100**	**500**
Direct use of solar heat per household with solar collector	kWh	**300**	**1,500**
Solar heat compared with residential electricity consumption	%	**15.5**	**77.7**
All country			
Direct residential use of solar heat	GWh	**960**	**4,800**
Domestic electricity consumption	GWh	131,267	131,267
Electricity consumption for residential heating (15%)	GWh	19,690	19,690
Solar heat as compared to electric heat	%	**4.9**	**24.4**

[1] Recent (as of July 2016) studies and assessments by PROCEL indicated that around 5% of households made use of solar heating.

between 420 and 750 kWh/m² provided by the manufacturers/suppliers. The table on the previous page compares the two methods using statistics for the year 2015 (yearly data).

The first method (assessing the avoided electricity consumption) estimates solar heat production/use as 300 annual kWh per household with solar collector, which compares as 15.5% of the annual electricity consumption of a typical Brazilian household. This figure is very close to the 15% of residential electricity consumption being used for heating purposes found by the above-mentioned 2015 study by PROCEL. As for the whole country, the first method estimates the solar heat residential use comparing as 4.9% of the country's total residential electricity consumed for heating purposes, which is pretty much in line with the 4.7% of households estimated as possessing solar collectors. By comparison, the second method (employing the suppliers' and/or manufacturers' specifications) yields percentages five times higher than the typical number you would expect, at 77.7% and 24.4% respectively, which seem out of line with reality.

For these reasons, for estimating direct residential use of solar heat, Brazil's Ministry of Mines and Energy chose the method of assessing avoided electricity consumption, rather than relying on manufacturers' or suppliers' specifications.

Bioenergy: The Achilles heel of renewable energy statistics

Adrian Whiteman, IRENA

Recent years have seen a dramatic increase in the use of renewable energy for electricity generation. Driven by falling costs and supportive policies, wind and solar energy have expanded rapidly in many parts of the World, so that renewables now account for about one-fifth of all electricity generation. However, despite these developments, bioenergy still accounts for about 70% of renewable energy supply and consumption.

While renewable energy statistics are improving in most countries, there are still many problems with the collection and reporting of bioenergy data, especially in non-OECD countries. These countries account for a major share of bioenergy consumption, so uncertainties about their use of bioenergy has an impact on renewable energy statistics at the global level.

This short article describes some of the areas where IRENA has noted major differences in the data reported by countries and international agencies that could be investigated further.

So-called "traditional" biomass use

Many non-OECD countries do not collect statistics about the use of primary solid biomass, so most agencies reporting global energy statistics estimate consumption in some way. For residential consumption, one of the most common estimation techniques used by agencies is to multiply population by a constant level of consumption per capita (derived from whatever information was available for a country at some time in the past).

One exception to this is FAO, which stopped using this method to estimate wood fuel consumption in 2000. Since 2000, FAO has produced wood fuel estimates using a model that takes into account population, as well as other factors such as urbanisation, income per capita and forest cover. This model has resulted in a much flatter trend in estimated consumption since 2000.

The differences in so-called "traditional" biomass use reported by IEA, UNSD and FAO are shown in the figure on the next page. The trend for FAO only includes wood fuel (fuelwood and the wood used to make charcoal), so it is lower than the other two lines. However, what is most alarming is the different slopes of the three lines.

By estimating biomass use as population multiplied by a fixed per capita consumption level, the IEA and UNSD datasets show a continuously increasing trend in consumption that is largely a reflection of population growth and results in a huge difference compared to the FAO estimates.

There is some evidence to suggest that traditional biomass use has not expanded in line with population growth. For example, the figure below also shows WHO statistics for the number of people relying on solid fuels, which has hardly increased since 1990. Multiplying those figures by constant per capita consumption would result in a trend in that is similar to the FAO estimates.

This uncertainty about the real trend in traditional biomass consumption is important for the calculation of renewable energy as a share of final energy consumption, which is an SDG Energy indicator. At present, the SDG indicator shows this share increasing from 17.5% in 2000 to 18.3% in 2014, but if traditional biomass use has really not increased by much since 2000, the share would not have increased but actually fallen to 16.8% in 2014.

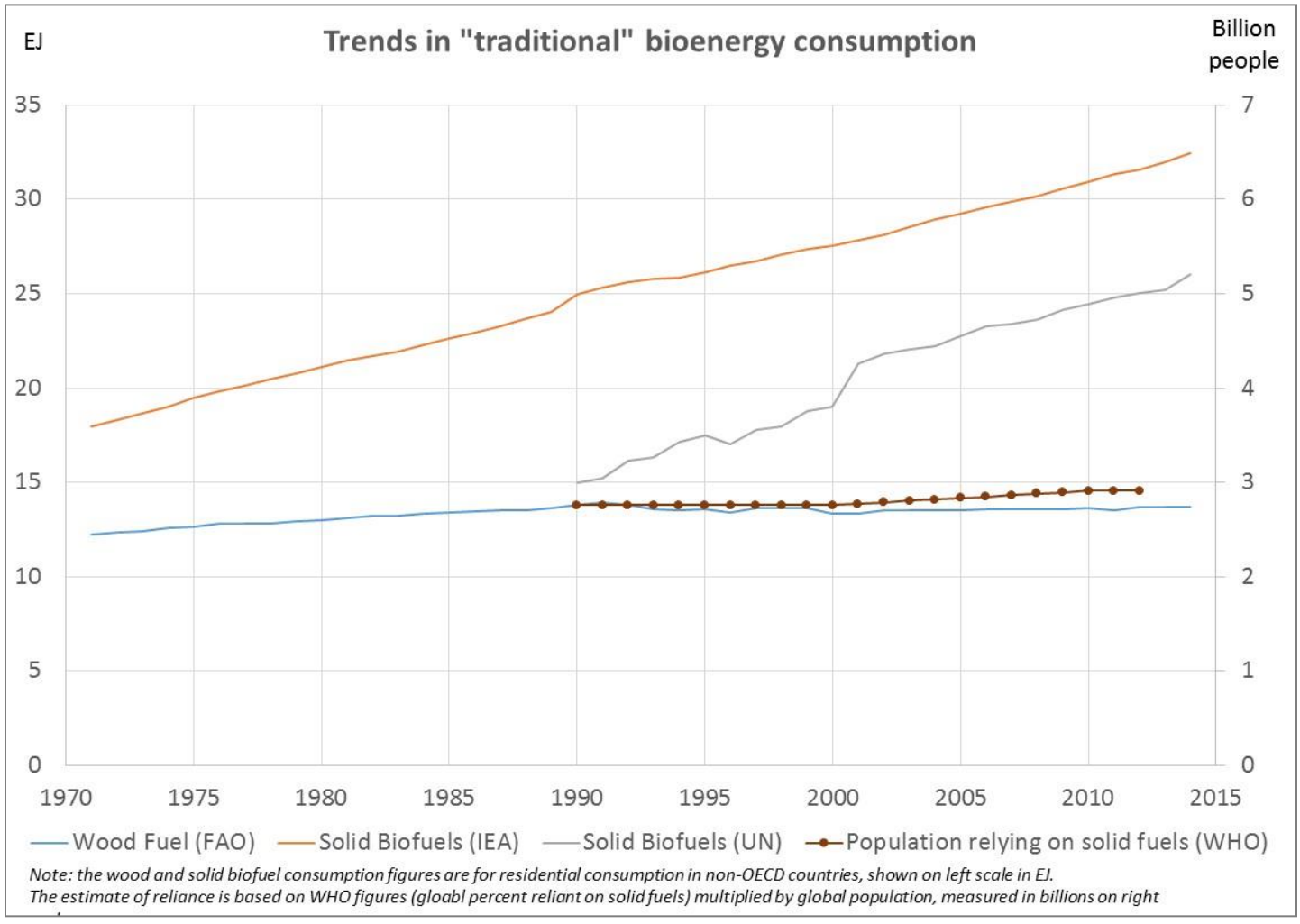
Non-residential biomass use

While residential consumption may be over-estimated, the opposite is true for non-residential consumption. Statistics about non-residential biomass use are also unavailable for many countries but, in this case, very few estimates are made to fill these gaps.

At present, global energy statistics report industrial use of solid biomass in non-OECD countries as about 13% of final consumption. The majority of this is found in a few countries in Asia and South America where there is production of CHP from bagasse and black liquor in the sugar processing and pulp industries. The reported use of solid biomass purely for process heat or in the commercial and public services sectors is negligible.

In many countries, a significant amount of solid biomass is used for energy in activities such as wood and food processing, bakeries, restaurants and public buildings, but most of this consumption is currently missing in global energy statistics.

For example, FAO's analysis of wood energy use suggested that consumption in commerce and public services amounted to an additional 17% on top of residential consumption on average. Although this was based on a relatively small number of studies that



have measured both residential and non-residential biomass use, it does suggest that the latter could be significant.

In addition, the use of biomass for drying forest products and estate crops (tea, coffee, tobacco) and for process steam in agro-industry (e.g. oil palm processing) may also be substantial. Based on crop production levels and the energy required to process each tonne of these crops, these uses alone could amount to as much as 25-30 EJ of bioenergy which is largely unrecorded at present.

Biogas

The use of biogas for heat and power has rapidly expanded for many years now in Europe, but it is also starting to grow in many other countries that are not always captured in global statistics.

For example, IRENA's electricity statistics report biogas electricity production in about 25 countries that are not currently included in other international datasets. The generating capacity in these countries is about 350MW (or about 25% of non-OECD biogas capacity) and much of this has appeared in the last five years.

About 30 countries also have programmes to expand the use of biogas for cooking, but are currently reported as having no biogas production. This includes some that have had programmes for many years with thousands of plants installed.

International trade

International trade in solid and liquid biofuels is another area that is expanding rapidly and where energy statistics seem to be falling behind. For example, the energy statistics for quite a few countries report no bioenergy trade or trade flows that do not match their international trade statistics (e.g. for wood pellets). The pelletisation and trade in other types of biomass (e.g. straw, seed husks, oil palm) is also growing rapidly, making it very difficult to track these energy flows.

Calorific values

Uncertainties about the calorific values of solid and liquid biofuels is not a new problem in energy statistics and there have been improvements in some regions such as Europe and North America, where the UNECE and FAO have worked with countries to increase the consistency between forestry and energy data.

However, this remains a difficult issue that is only going to increase in complexity as many more different types of biomass are used for energy. Even in the case of liquid biofuels, the number of different fuel types is increasing and their calorific values cover a wide range.

IRENA's work with countries has shown that many energy statisticians are still unfamiliar with the factors that influence the calorific values of different biofuels and the typical ranges of calorific values that might be expected. The many different physical units used to measure biofuels adds another layer of complexity that may account for the huge variation in calorific values that are reported by countries.

The way forward

With the rapid developments in renewables and the expectation that bioenergy will have to play an even greater role in energy supply in the future, the need to address some of these issues has never been greater and it seems that two major tasks lie ahead.

The first is to continue building capacity in countries to measure and collect bioenergy data or make reasonable local estimates. The second is to improve co-ordination between agencies, so that these statistics are collected efficiently and appear to be more consistent. IRENA welcomes suggestions about how this can be done and looks forward to working with others to achieve these goals.

15TH REGIONAL JODI TRAINING WORKSHOP IN TUNIS

The 15th Regional JODI Training Workshop was held from 11 to 13 April 2017 in Tunis, Tunisia. The Workshop was hosted by the Tunisian Ministry of Energy, Mines and Renewable Energy and organized by the International Energy Forum (IEF), together with the following JODI partners: International Energy Agency (IEA), the Gas Exporting Countries Forum (GECF), the Organization of the Petroleum Exporting Countries (OPEC) and UNSD. The African Energy Commission (AFREC) collaborated with the JODI partners in the preparation for the workshop, helping to increase attendance by inviting their focal points from countries in the region. As a result, more than 43 delegates from countries in the Northern and Sub-Saharan Africa regions took part in the workshop, which was designed to raise awareness and build better understanding of JODI, and to improve submissions and overall data quality and energy data transparency in the regions. The Workshop targeted participants who are in charge of hydrocarbon data collection at national administrations and who participate or may start participation in JODI through completion of the monthly JODI-Oil and JODI-Gas questionnaires.

Mr. Ridha Bouzouada, Director General of Energy from Ministry of Energy, Mines and Renewable Energy, Dr. Sun Xiansheng, Secretary General of IEF and Mr. Atef Marzouk, Interim Executive Director of AFREC started the workshop by welcoming all the participants and international organizations. The first day was focused on the importance of oil and gas data transparency, the background of the initiative, the presentation of the JODI Oil and Gas questionnaires, as well as some data assessment methods. As the JODI Workshop was held under the framework of the 3rd IEF - OFID Symposium on Energy Poverty, the second training day started by attending the Symposium's opening session. OFID is the OPEC Fund for International Development. The afternoon involved more practical activities, with a session on how to use the JODI databases and on the different tools used to assess the data quality. On the third day other global initiatives like InterEnerStat and the Oslo City Group were presented, with focus on their harmonization and methodological outcomes, such as the IRES, the Standard International Energy Product Classification (SIEC) and the ESCM, and the rest of the morning was dedicated to exercises on how to fill the JODI questionnaires.

Further details can be found at: *https://www.jodidata.org/events/15th-regional-jodi-training-workshop-for-african-countries*.

The 16th JODI training workshop, targeting countries from Eastern Europe, Caucasus and Central Asia regions, is scheduled for 12–16 March 2018 in Odesa, Ukraine.

11TH MEETING OF THE OSLO GROUP ON ENERGY STATISTICS

In May 2017 the 11th meeting of the Oslo City Group on Energy Statistics took place in Stockholm, Sweden. It was hosted by the Swedish Energy Agency, and was chaired by Mr. Ville Vertanen of Statistics Finland. As agreed at the previous meeting, the Group primarily considered the work in the areas of administrative data sources and energy data dissemination.

The working group presented several country practices on the use of administrative data sources. While legislation is a key to ensure the accessibility of administrative data for statistical purposes, different countries faced entirely different situations: some have advanced legislation covering the use of administrative data while others do not have any legislation on this.

Digitalization was another important element of discussion. Digitalization adds significant value to questionnaires, for example, regarding customizing the form based on the receiver's characteristics. It was highlighted that, with digitalization, there was a need for solid classifications and stable methods, which need to be balanced in the context of an increasingly changing society. It was noted that there were sources that provided real-time data (daily, hourly or minute-by-minute) and the key discussion in this regard focused on whether to choose that data for producing official statistics.

The working group on energy data dissemination practices presented a number of practices undertaken by international and regional organizations, as well as by individual countries. It was stressed that social media (e.g., Facebook, Twitter and Instagram) played an important role in the dissemination of statistics today. The presentations included new visualizations of energy flows and short videos in which the basic concepts of energy were explained. The presentations were very useful, particularly for non-expert users of statistics and the participants expressed a strong interest in exploring the use of videos for training purposes further.

Oslo Group on Energy Statistics

The workshop concluded with a decision to concentrate efforts on the working groups focused on energy data dissemination and administrative data sources, as these are the groups where both most interest lies and where concrete outcomes can be achieved relatively easily. The group will also consider whether the use of geospatial data in energy statistics should be pursued by its own working group.

More details on the Oslo Group are available at https://unstats.un.org/oslogroup/. The website shows presentations from the meeting together with the final meeting report.

EDITORIAL NOTES

The Energy Statistics newsletter is prepared by the Industrial and Energy Statistics Section of the United Nations Statistics Division, Department of Economic and Social Affairs.

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