

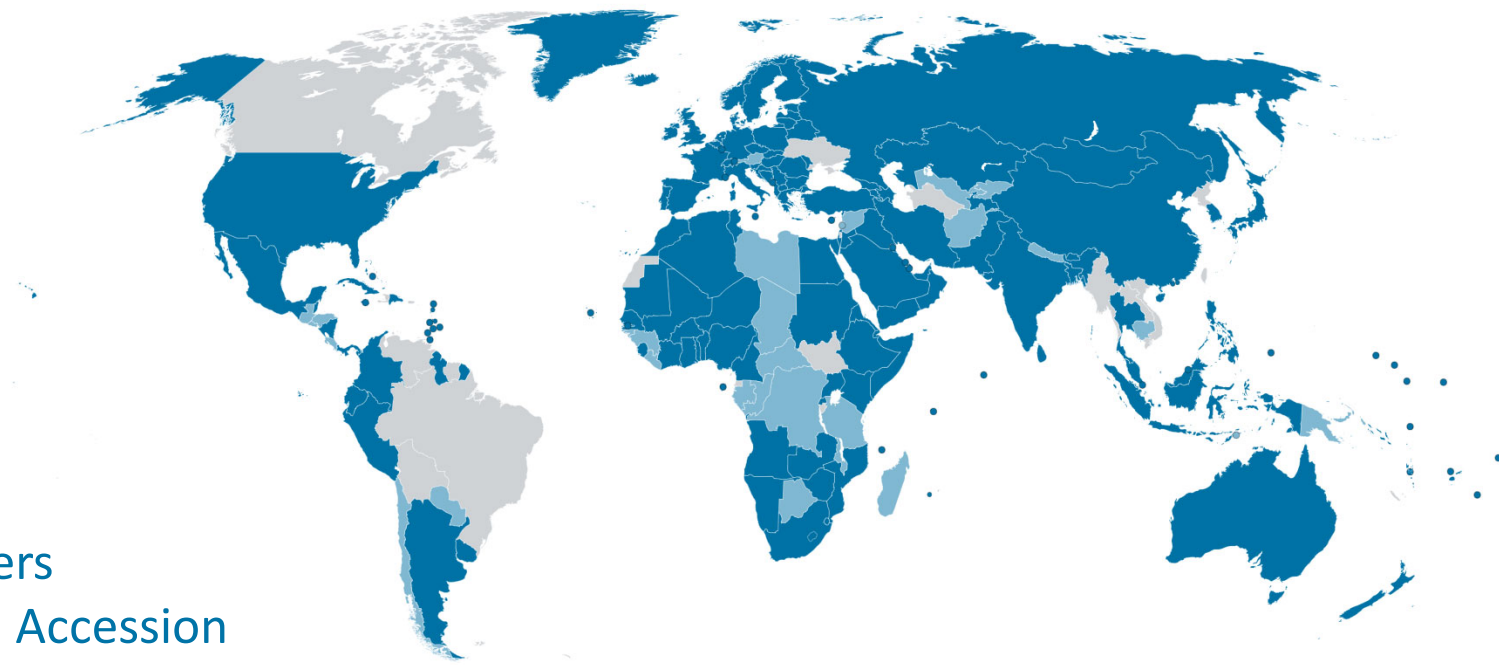
The IRENA Renewable Energy Statistics Questionnaire

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- Background
- Challenges: characteristics of renewable energy
- IRENA's approach to data collection
- IRENA energy products and definitions
- IRENA energy balance
- Further developments

Background: IRENA

- Established in 2011
- First intergovernmental organisation with HQ in Middle East
- Headquarters in Masdar City, Abu Dhabi, UAE
- IITC in Bonn and Observer to the UN in New York



150 Members
26 States in Accession

Background: data needs

IRENA has been asked by members to collect renewables data, while not duplicating the work of others.

Data is used to measure:

- Energy sector transformation (targets)
- Energy SDG: access; renewables; efficiency
- Market developments, investments, etc.

But renewables are about more than just MW!

Challenges with RE data

Renewable energy

- Thermal and non-thermal
- Great variation in scale
- Off-grid more common
- Many producers
- Biofuels very variable
- Considerable innovation

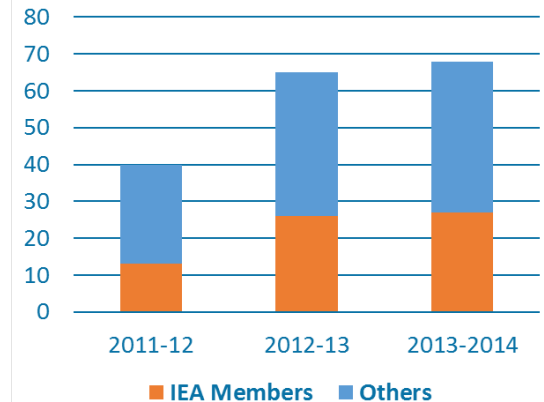
Nonrenewable energy

- Thermal energy
 - Often large-scale
 - Mostly grid-connected
 - Industrial/utility production
 - Fuels well specified
 - Stable technologies
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- Less familiarity with measurement conventions
 - Hybrid systems, cofiring, accounting for heat

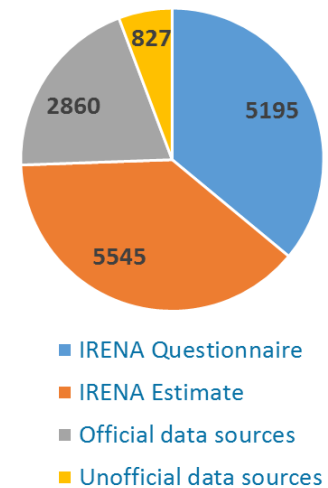
IRENA data collection

- Pre-fill with historical data
- Data collection cycle
 - *Y+10: Send questionnaires*
 - *Y+12: Validate replies*
 - *Y+3: Publish capacities (2016)*
 - *Y+18: Publish yearbook(2015/2016)*
- Response rate is increasing
- Coordinate with APEC, IEA and others on timing and training

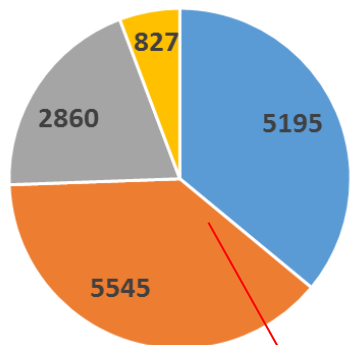
Number of countries returning IRENA questionnaire



Sources of all capacity data points 2000-2015



Sources of all capacity data points 2000-2015



- IRENA Questionnaire
- IRENA Estimate
- Official data sources
- Unofficial data sources

letter “o” - national statistical offices, government departments, regulators and power companies.

letter “u” - industry associations and news articles.

letter “e” - variety of different data sources.

Gross electricity production in MWh (Валовое производство электроэнергии в МВт.ч)	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
ELECTRICITY PLANTS: RENEWABLE (ON-GRID) Электростанции: Возобновляемые источники энергии (Сетевые)	7,531,000	8,081,000	8,890,000	8,600,000	8,000,000	7,900,000	7,700,000	8,200,000	7,400,000	6,800,000	8,022,023	7,900,000	7,603,055	7,737,111	8,277,400
Hydropower (Гидроэнергия)	7,531,000	8,081,000	8,890,000	8,600,000	8,000,000	7,900,000	7,700,000	8,200,000	7,400,000	6,800,000	8,022,023	7,900,000	7,600,000	7,731,000	8,262,831
Small hydropower (<1 MW) (Малые (<1 МВт))	3,551	3,806	4,179	4,037	3,755	3,708	3,615	3,849	3,460	3,173	3,733	3,457	3,138	3,179	3,397
Medium hydropower (1-10 MW) (Средние (1-10 МВт))	91,999	106,579	134,495	142,397	132,463	130,807	127,495	135,774	151,605	151,746	201,577	186,666	169,466	204,877	218,971
Large hydropower (>10 MW) (Крупные (>10 МВт))	7,435,450	7,970,614	8,751,325	8,453,565	7,863,782	7,765,485	7,568,890	8,060,376	7,244,936	6,645,081	7,816,713	7,709,877	7,427,396	7,522,944	8,040,463
Pumped storage (ГАЭС)															

- **Seven main groups:** hydro; solar; wind; marine; geothermal; bioenergy; other
- Definitions are mostly similar to other organisations, broadly in-line with International Recommendations for Energy Statistics (IRES), but with greater detail for bioenergy

- **Solid biofuels: 12 product categories**
 - Woodfuel; Energy crops;
 - Wood waste; Black liquor; Straw; Bagasse; Rice husks; Other vegetal and agricultural waste; other primary solid biofuels (animal waste); renewable municipal waste;
 - Biomass pellets and briquettes; and charcoal.

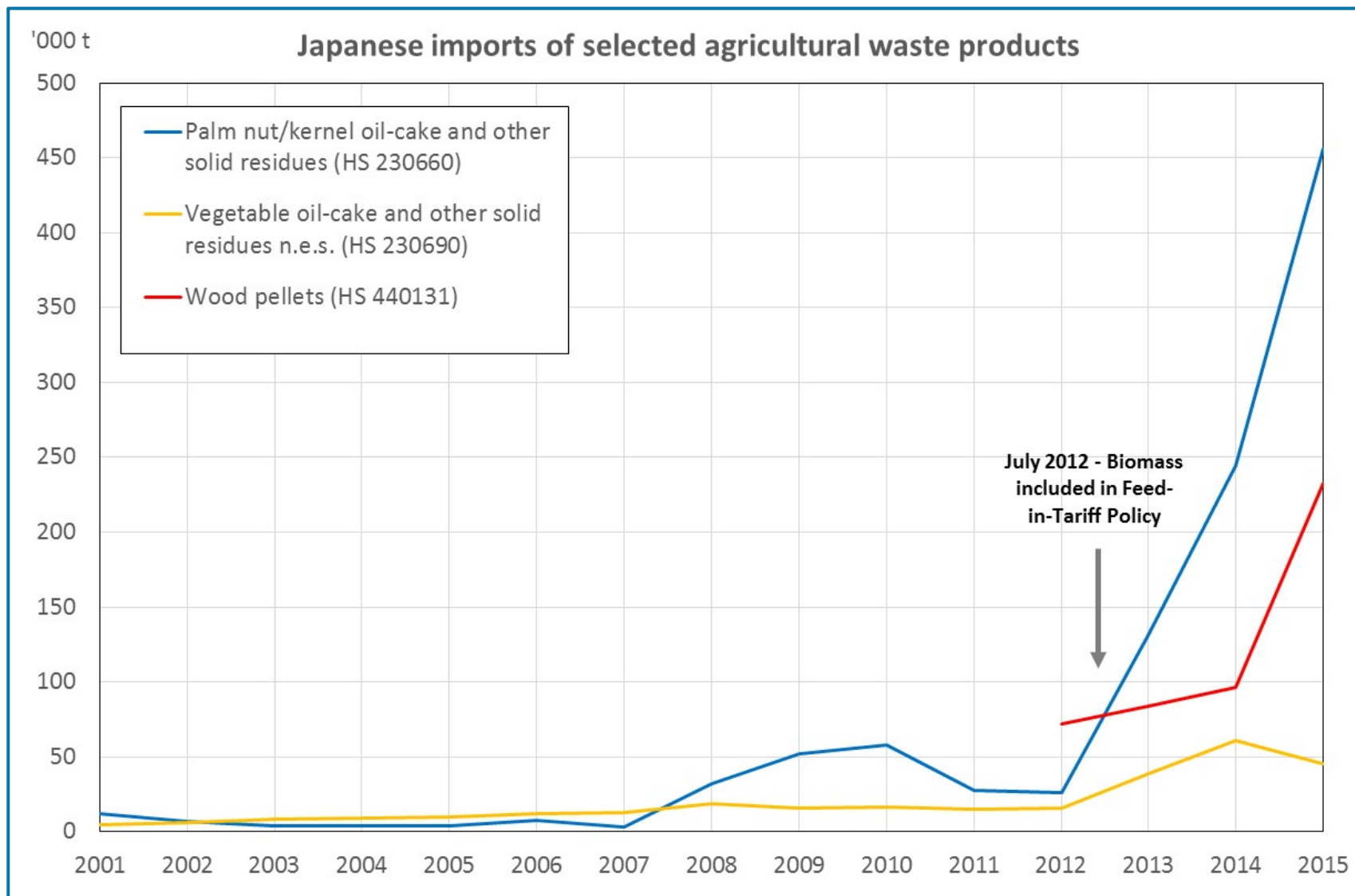
- **Biogas: 4 product categories**
 - Landfill gas;
 - Sewage sludge gas;
 - Other biogases from anaerobic fermentation; and
 - Biogases from thermal processes.

- **Liquid biofuels: 6 product categories**
 - Conventional biogasoline; Advanced biogasoline;
 - Conventional biodiesel; Advanced biodiesel;
 - Bio jet kerosene; and
 - Other liquid biofuels.

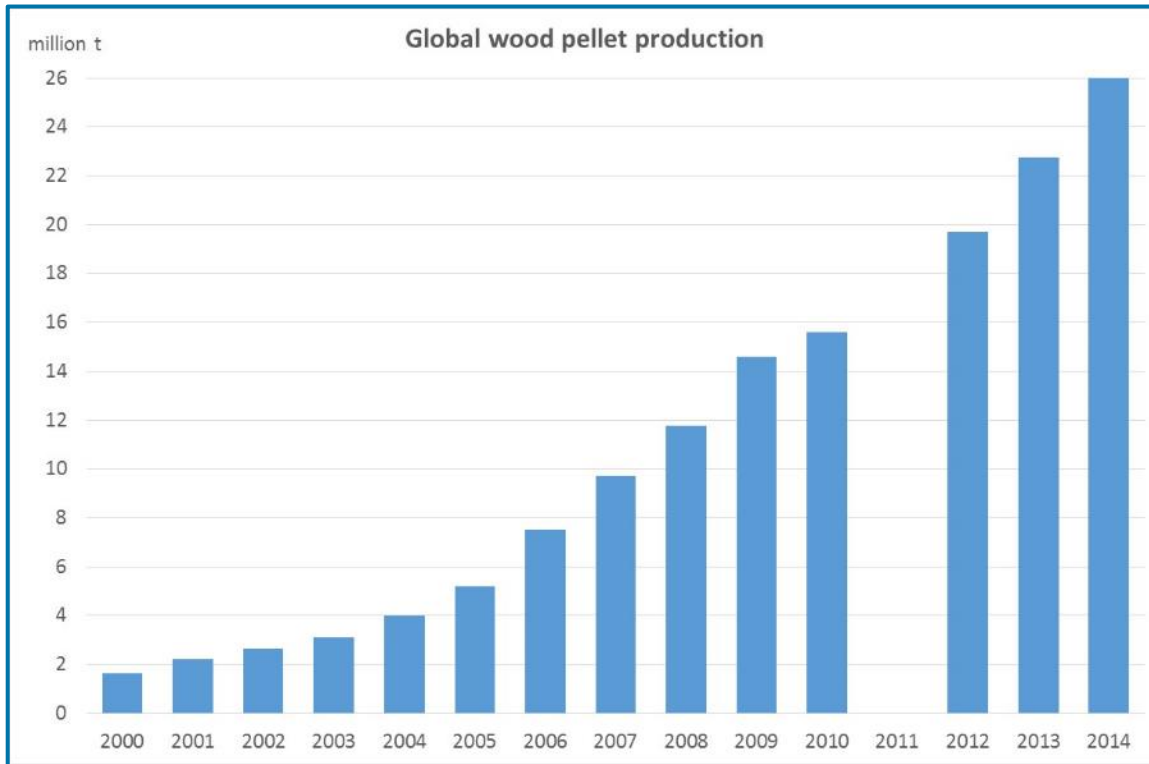
Why so many products?

- **Sustainability:** Natural resource or waste?
- **Energy content:** Vastly different
- **Global scope:** Biofuels vary by region, usually only 6-8 types per country (12 in Austria)
- Useful to monitor market developments
- Building data framework for the future

Market developments



Biomass pellet development



Pellets are a rapidly growing part of the biofuel market

Advanced liquid biofuels are also being developed



Wood



Palm (EFB)



Rice husk



Straw



Waste (SRF)



Torrefied

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- **Trade data:** Solar panels; solar lanterns; solar water heaters; biomass pellets – refinement of Harmonized System (HS) codes
 - **Estimation techniques:** Using census and household surveys to examine energy data
 - **Energy content:** More work can always be done to understand calorific values