

# Composition, process and function:

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## Challenges to identifying the environmental credentials of equipment within the HS

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Visualising a Greener HS to support environmentally sustainable trade.  
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# Overview

- IRENA, renewable energy and international trade
- Observable characteristics of environmental goods
- Composition or content of a product
- How a product works (process)
- What a product does (function)

# International Renewable Energy Agency (IRENA)

**Established:** 4 April 2011

**Headquarters:** Abu Dhabi

**Member states:** 184 (168+16)

**Mission:** Supporting countries in their transition to greater use of renewable energy

## **Activities:**

- Promote and support international co-operation
- Provide technology advice (office in Bonn, Germany)
- Produce studies on policy, finance, knowledge, statistics



# Types of renewable energy

**Renewable energy (RE) definition:** Energy that can be used without reducing its availability in the future.

Type of renewable energy		Product type(s)	International trade
	Hydropower	Electricity	Relatively small amounts of electricity traded, but renewables not separated.  Trade in production technologies is large.
	Marine energy		
	Wind energy		
	Solar energy	Electricity and heat	Same as above (electricity and technologies).  Almost no trade in heat.
	Geothermal energy		
	Bioenergy	Electricity, heat and biofuels	Most trade is solid and liquid biofuels.

**Others:** Ambient heat (heat pumps), hydrogen and derivative products, possibly others in the future (nuclear fusion?)....

# Current status of renewable energy in the HS

## Hydro, marine and wind energy:

Electricity is clearly identified in the HS, as are the main generation technologies:

- 27.16.00 Electrical energy (c. USD 30bn)
- 85.02.31 Generating sets, wind-powered (c. USD 8bn)
- 84.10.00 Hydraulic turbines, water wheels (c. USD 1bn)

New marine energy technologies may not be differentiated, but trade is likely to be very small.



# Current status of renewable energy in the HS

## Solar energy:

Solar energy technologies identified separately in HS 2022:

- 84.19.12 Solar water heaters (c. USD 0.15bn)
- 85.01.71/72/80 Photovoltaic generators
- 85.41.42/43 Photovoltaic cells (c. USD 50bn)
- 94.05.41 Photovoltaic luminaires + light fittings, LED (c. USD 0.5bn)

Another code is proposed for portable solar lights (85.13.11) in HS 2027. Other solar powered devices exist but may be difficult to define in HS.



Portable solar lights



Solar street light



Solar pump



Solar fridge

# Current status of renewable energy in the HS

## Geothermal and bioenergy:

For generating heat and power, the technologies use steam and can not be differentiated from those using other fuels.

Some trade in solid and liquid biofuels is identified in the HS:

- 44.01.10/11/12 Fuel wood (c. USD 0.6bn)
- 44.01.31/32 Wood pellets and briquettes (c. USD 4.7bn)
- 44.02.00 Wood charcoal (c. USD 1.5bn)
- 22.07.10/11 Ethanol (c. USD 10bn) - Note: this is all ethanol
- 27.10.20 Diesel blended with biodiesel up to 30% (c. USD 10 bn)
- 38.26.00 Biodiesel, pure and blend over 30% (c. USD 30bn)

Other types of solid biofuel exist but are not identified in HS.

Heading 38.26 has a limited definition of biodiesel (FAME).

Other new biofuels exist or are being developed (e.g. bio-LPG).

# Use of HS codes for renewables

## Support the adoption of renewables through tariffs

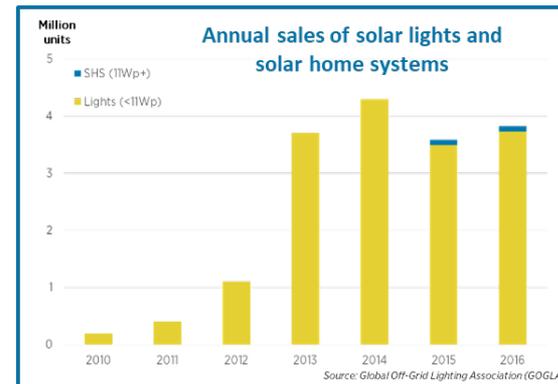
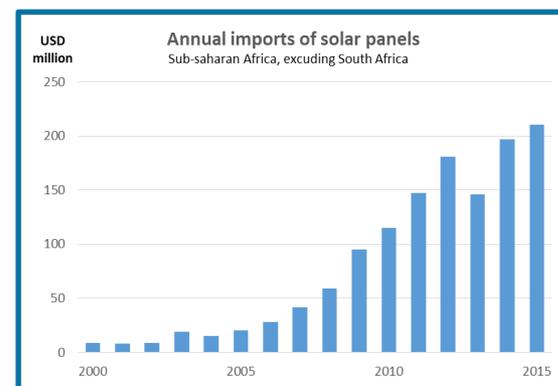
### Collection of statistics to monitor progress (SDG targets):

- Solar PV capacity and generation (e.g. huge amounts imported into Africa with little or no recorded solar generation)
- Electricity access (e.g. solar lights)

## Income and employment studies

### Consumption of biofuels

- Liquid biofuels
- Wood fuel (especially wood pellets)



Also used to measure fossil fuel use, but with some challenges.

# What are “environmental goods”?

**Renewable:** Products of biological origin (or, maybe, that are recycled or re-used in the “circular economy”)

**Energy efficient:** In energy data and analysis, this mostly refers to end-uses that provide an energy service (light, heat, motion) with a low energy input, but can also mean more efficient production or distribution. Could also mean products manufactured with low energy use (“embodied energy”).

**Low carbon/pollution:** Technologies that reduce emissions during energy generation or use. Could also be applied to other products (biomaterials, others made with low carbon emissions).

The **energy transition** is also likely to need a shift towards more electrification, energy storage and decentralised production, so technologies supporting this are helpful (e.g. electric vehicles, batteries, off-grid solar devices).

# Challenges for HS classification

## Three main types of observable product characteristics:

**Product composition:** Environmental goods may be identical to others (e.g. renewable electricity, liquid biofuels, hydrogen).

**How a product works:** Some energy efficient technologies can be identified (e.g. LED lights) but incremental improvements could be difficult to observe. Products designed to work with renewable power may also work with other power sources.

**What a product does:** Some products may have multiple uses (e.g. ethanol), but some environmental technologies may still be subdivided from others within the HS.

Overall, the biggest challenge is possibly that products in the HS can not be classified based on **how a product is made**.

# Possibilities: composition

## Renewable fuels:

- Pelletised crop waste used as fuel (straw, husks, oil palm)
- Hydro-treated vegetable oil (HVO) biodiesel  
Currently in 27.10.19 Medium oils and preparations, of petroleum or bituminous minerals, not containing biodiesel, n.e.s.
- Other liquid biofuels (maybe, depending on the chemistry)
- Not possible: bio-LPG, “green” hydrogen and derivatives

## Others:

- Low-carbon cement
- Biomaterials (pure or composite products)
- Products made from recycled materials

**More complex products:** probably limited scope for identifying environmental credentials based on the material content of more complex products.



Bamboo bicycle

# Possibilities: process

## Devices powered by renewable energy:

- Solar powered water pumps (under 84.13)
- Wind powered water pumps (under 84.13)
- Solar fridges and/or direct drive fridges (under 84.18)
- Solar streetlights (under 94.05)
- Split heat pumps by heat source: ground/air/water (84.15/18)

Currently, heat pumps are not identified in 84.15.10 (window or wall air conditioning machines) but are in 84.15.81 and 84.18.61. The codes are not split by heat source.

## Energy efficient and/or low carbon technologies:

- Fuel cells (under 85.01/02?, not 85.06)
- Domestic electric induction cookers (under 85.16)
- Inverter-type air con. and fridges/freezers (under 84.15/18)
- Electric aircraft and ships? (Chapters 88 and 89)

# Possibilities: function

## Technologies supporting cleaner energy production:

- Wafers for PV cells, split into silicon/other (under 38.18)
- Flue-gas treatment technologies (under 84.21)
- Electrolysers (under 85.43)
- Split batteries by size or storage capacity (under 85.06)

Solar panel waste is also expected to grow significantly in the future and could become an interesting issue if a lot of this enters international trade.

# Summary and conclusions

**Overall, renewable energy technologies and fuels are now well identified in the HS**

**Main limitation is that some environmental credentials can not be observed**

- How a product is made (e.g. electricity, hydrogen)
- How a product performs (e.g. energy efficiency)

**Products with multiple parts may also be a challenge (e.g. what identifies a pump as a solar pump?)**

**Priorities for further consideration (feasible, important):**

- Some of the solid and liquid biofuels
- Solar devices (streetlights, fridges, pumps), induction stoves
- Batteries (to promote/monitor development of energy storage)

# Thank you

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Renewable energy statistics available at:  
<https://www.irena.org/Data>