Renewable energy in the World – Approaches in different countries

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IEA

Presentation overview

- Key renewables trends
- Introduction to renewables statistics
- Data collection challenges
- Approaches in different countries

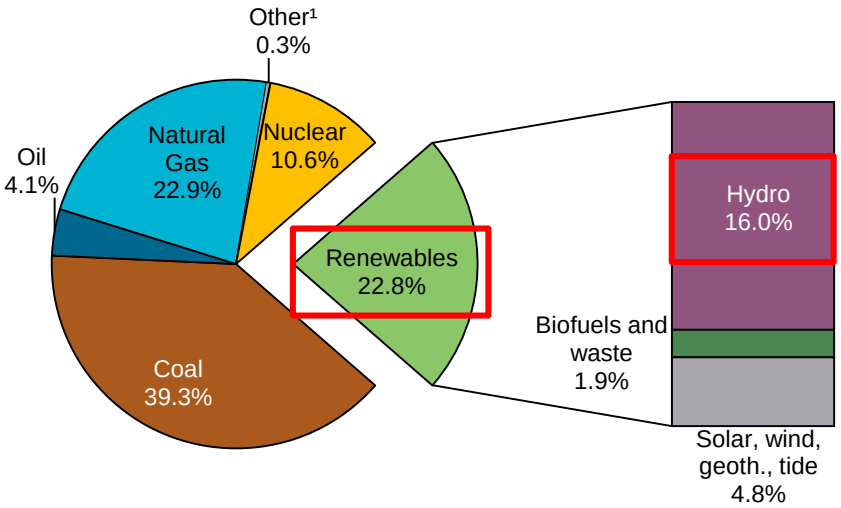
Renewables key trends

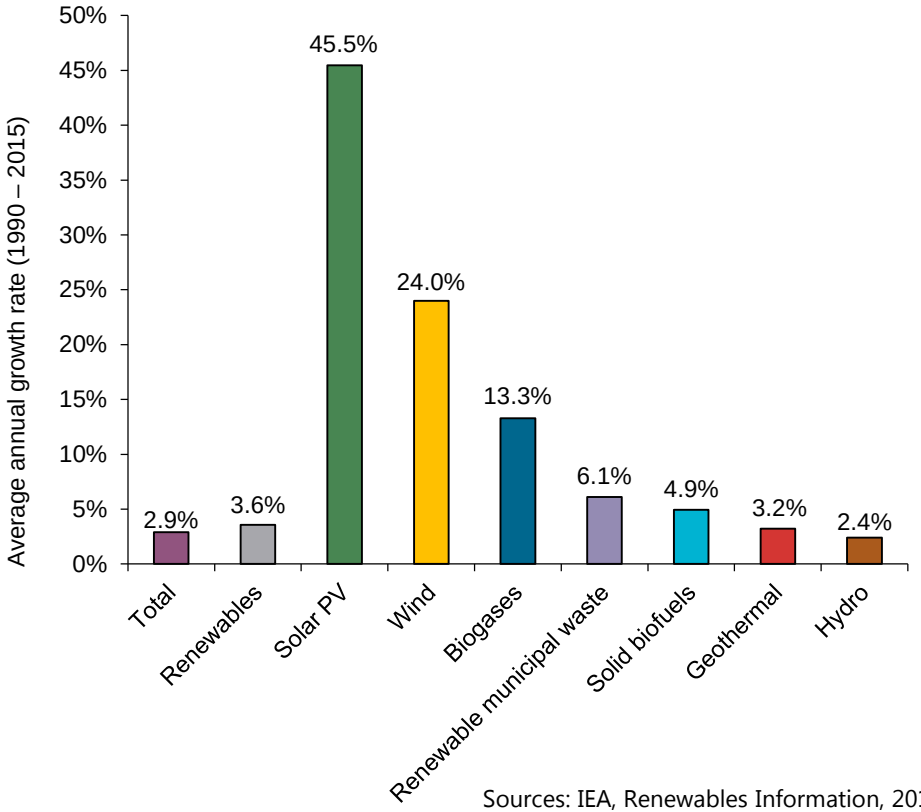
Fuel shares in world electricity production in 2015

Which renewable energy do you think takes the largest portion in Electricity production?

1. Hydro **2. Solid biofuels** **3. Solar PV**

Fuel shares in world electricity production in 2015





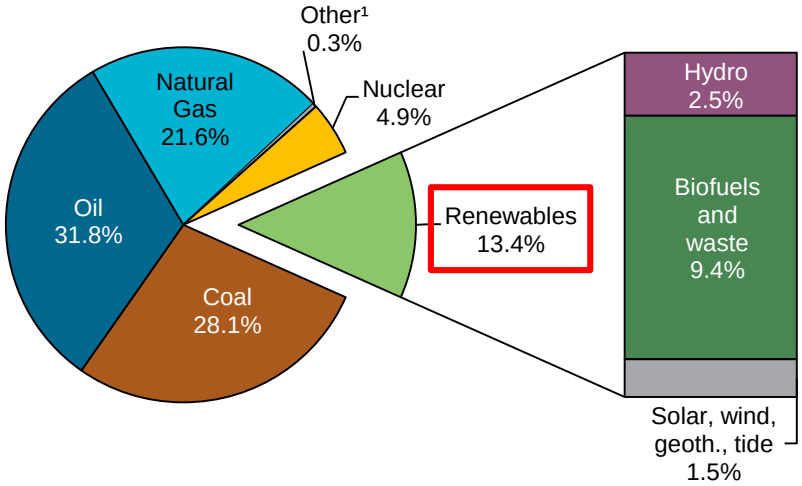
[1] Other includes electricity from non-renewable wastes and other sources not included elsewhere such as fuel cells and chemical heat, etc.

Sources: IEA, Renewables Information, 2017
IEA, World Energy Balances, 2017

Renewable fuels in the world 2015

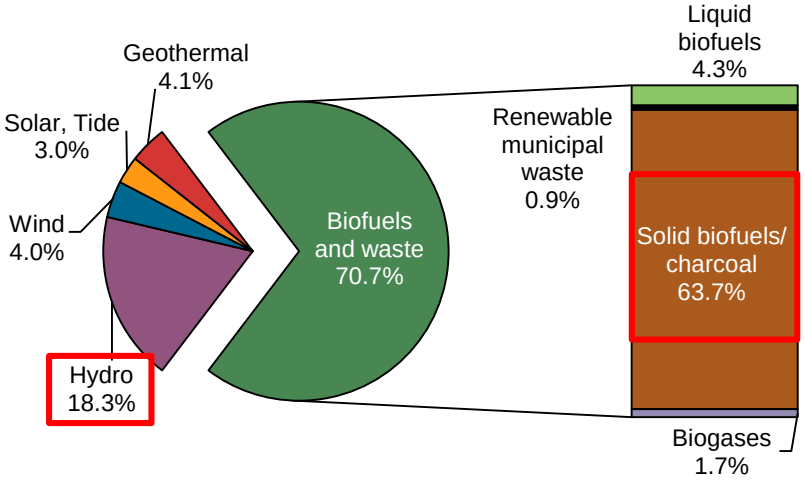
TPES

(Electricity trades excluded)



13,647 Mtoe

Renewables

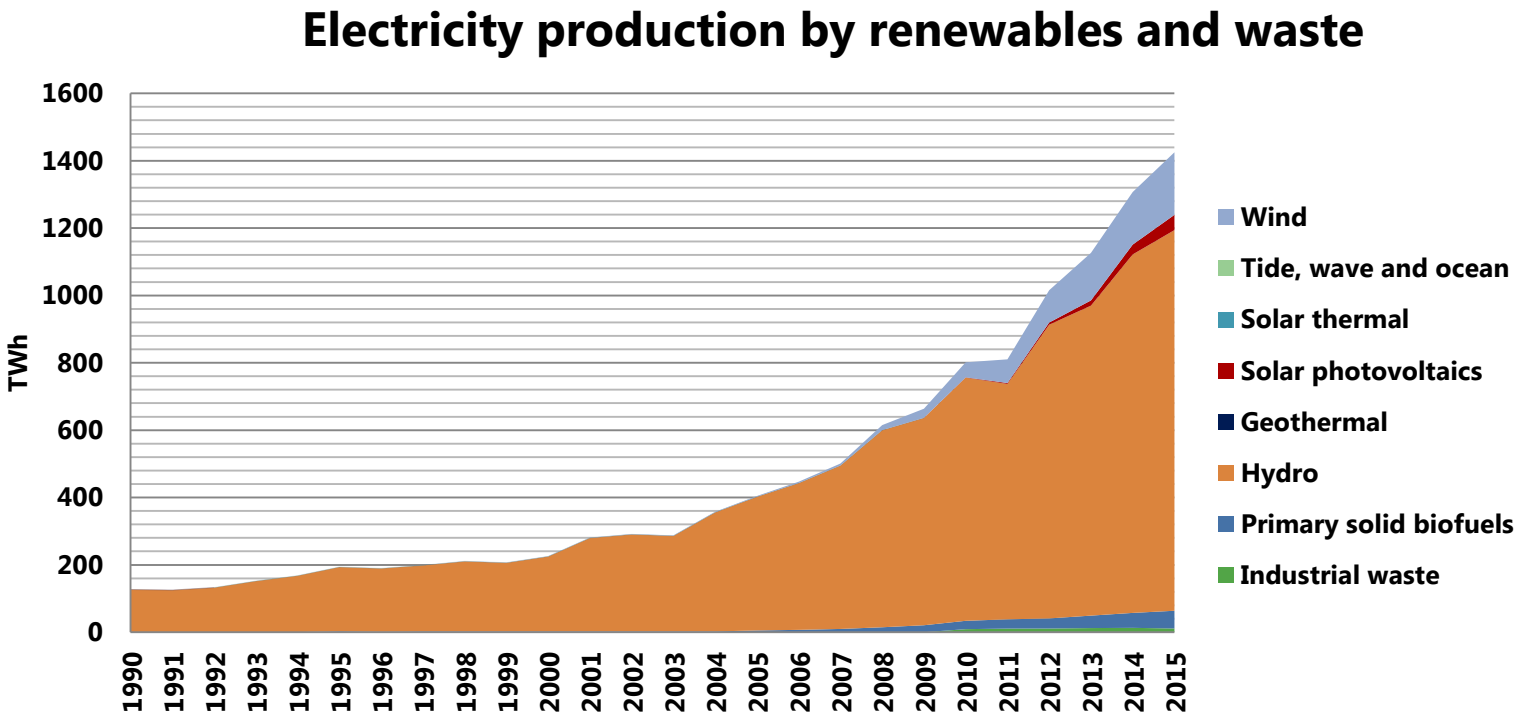


1,823 Mtoe

[1] Other includes non-renewable wastes and other sources not included elsewhere such as fuel cells

Source: IEA, Renewables Information, 2017

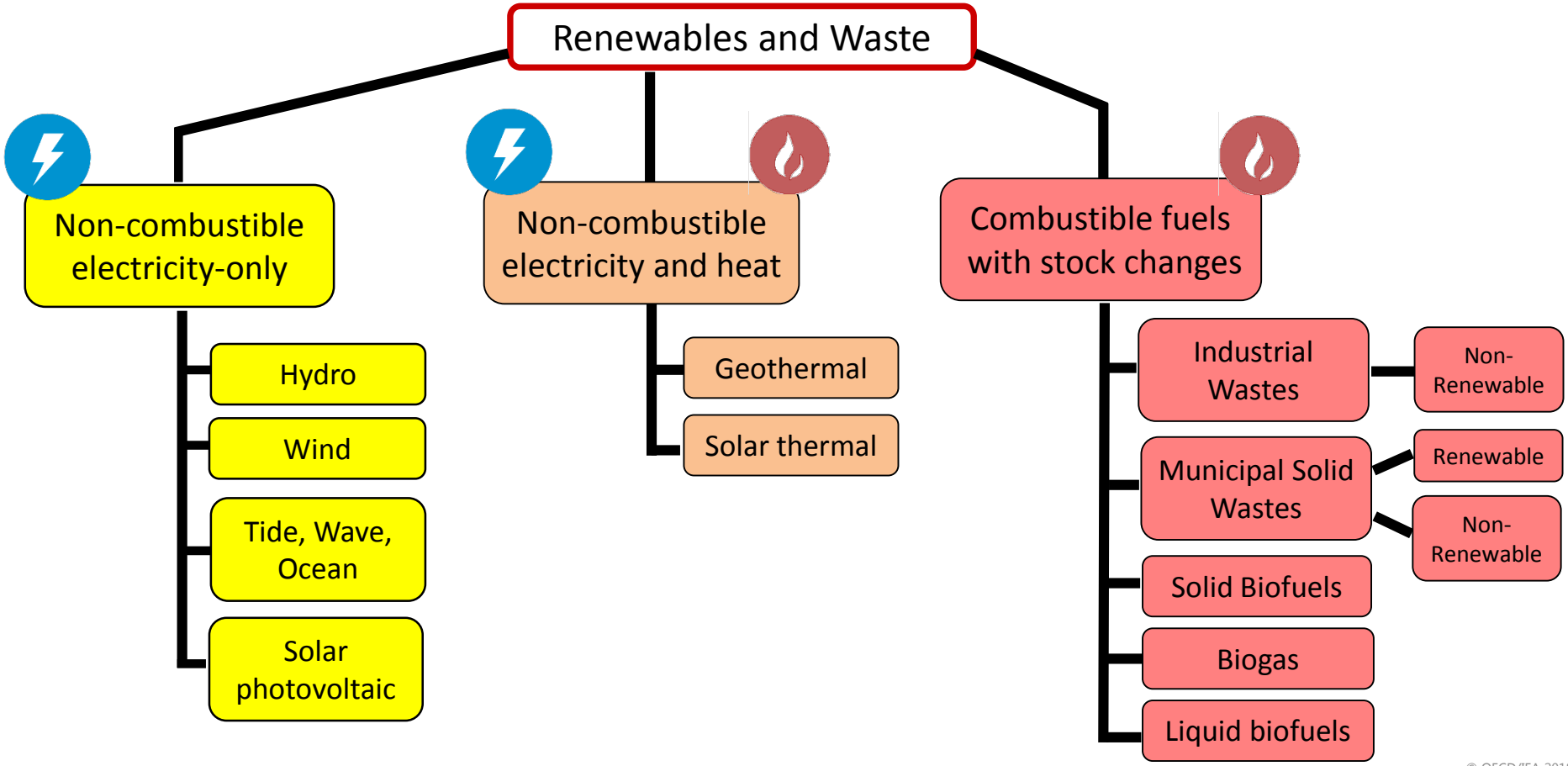
Renewable fuels in China



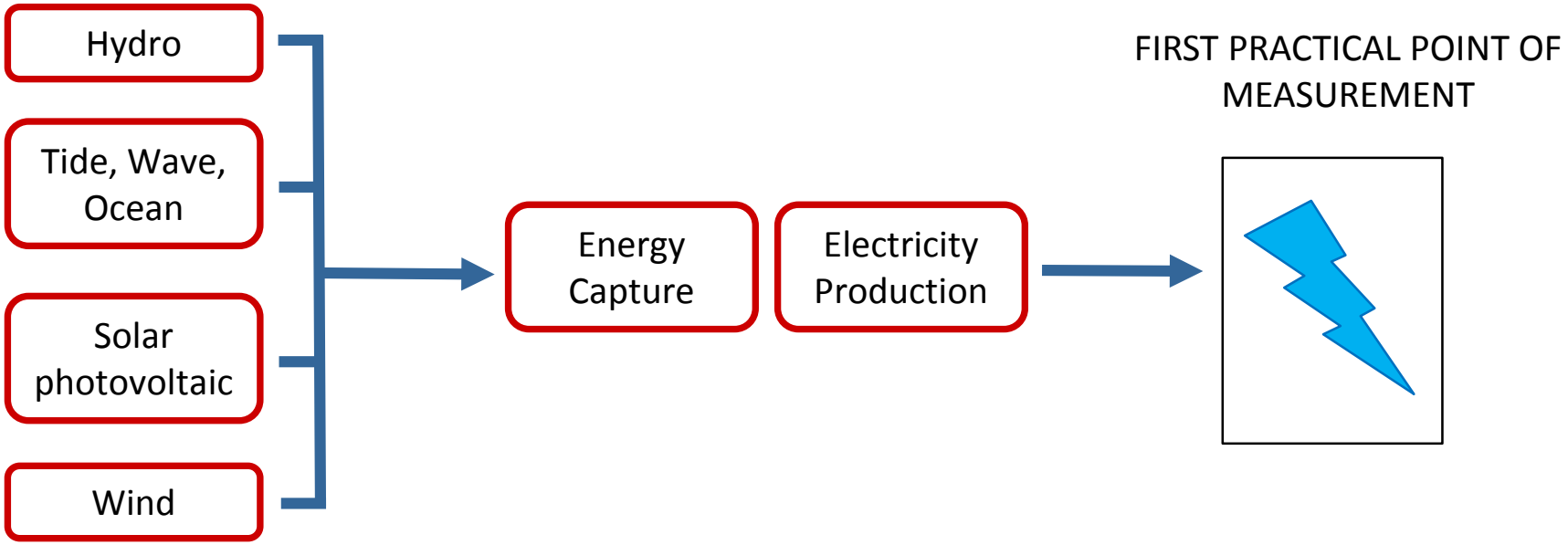
Source: IEA World Energy Balances 2017
Based on NBS data processed with IEA methodology

Renewables statistics

Classification

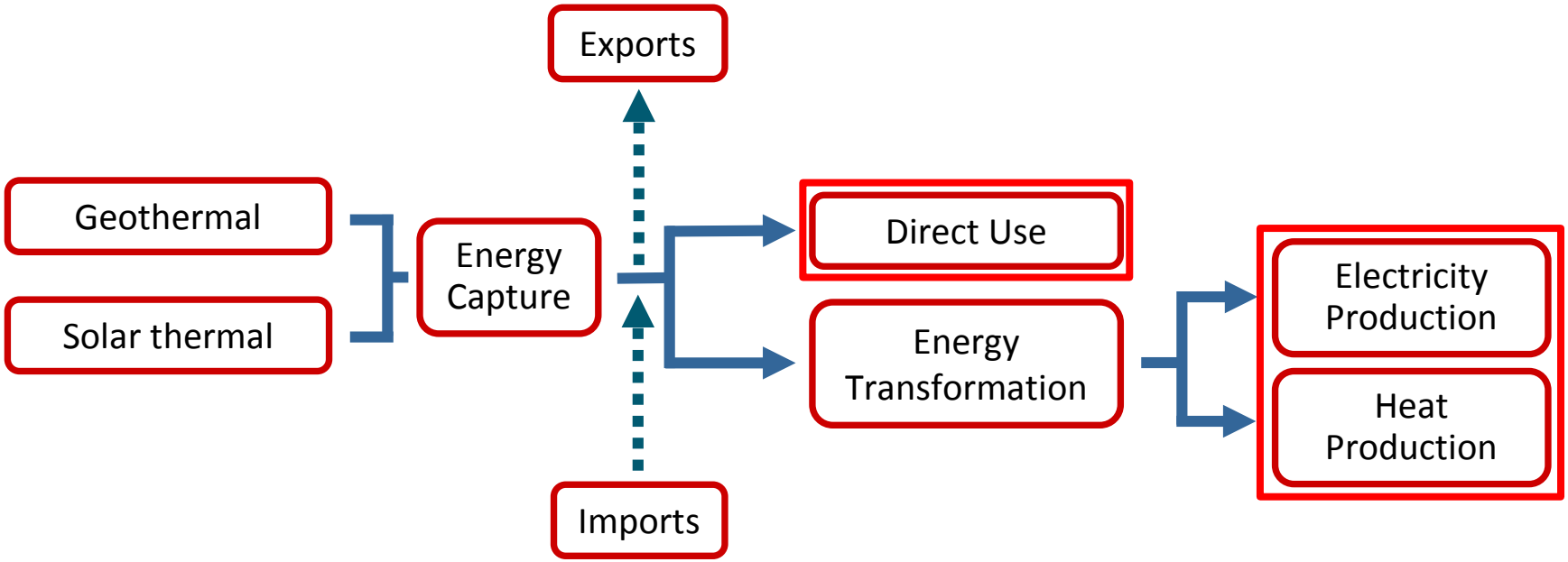


Classification: Non-combustible renewable electricity only (1)



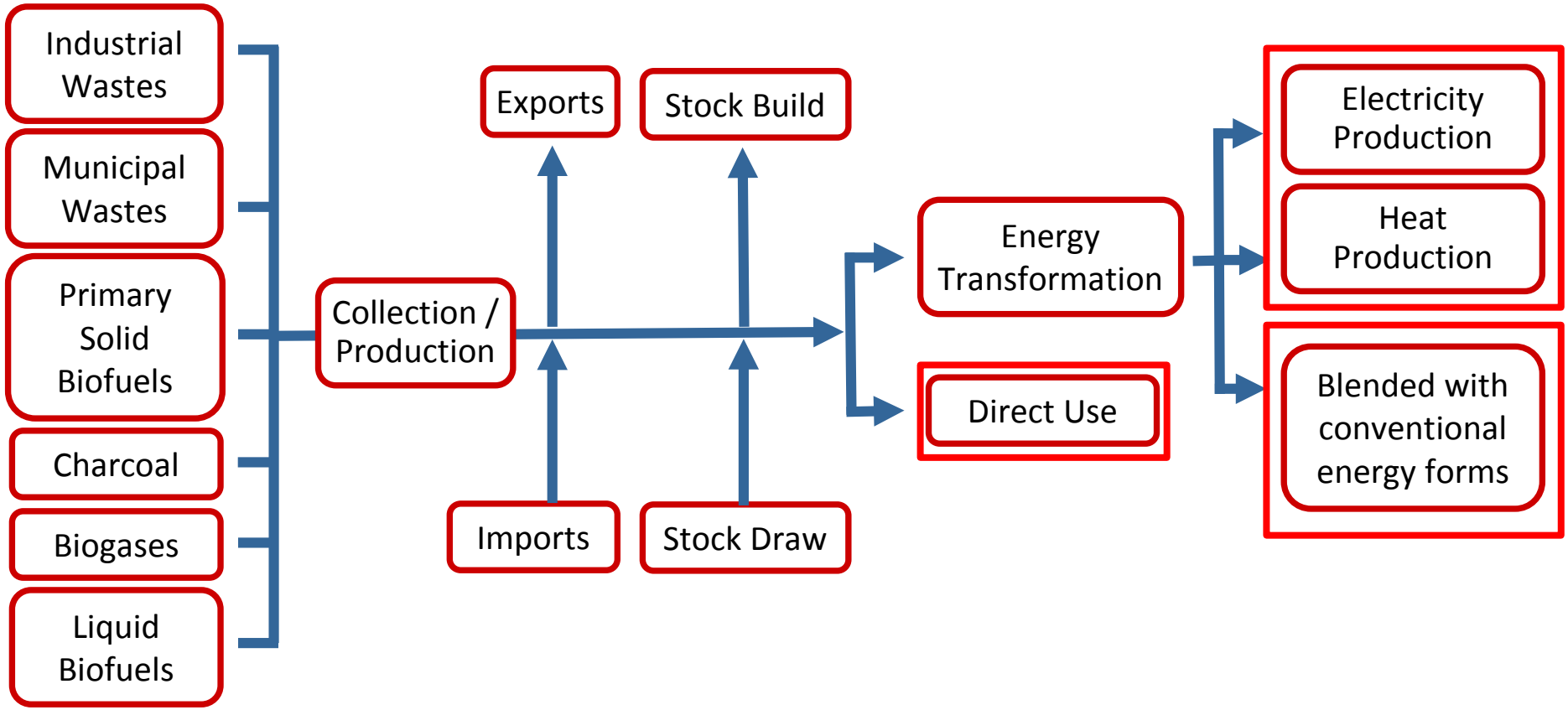
PRIMARY ENERGY FORM = ELECTRICITY

Classification: Non-combustible renewable electricity and heat (2)



PRIMARY ENERGY FORM = HEAT

Classification: Renewable and waste combustible fuels (3)



Biofuel: Energy vs. Non-energy

- Energy use of biofuel (Fuel) is included (e.g. wood for cooking, heating, charcoal transformation)
- Non-energy use of biofuel is **NOT** included (e.g. wood used for furniture, animal waste used as fertilizers)

Data collection challenges

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- Boundaries and definitions
  - Inclusion of primary product (e.g. liquid biofuels and biogases)

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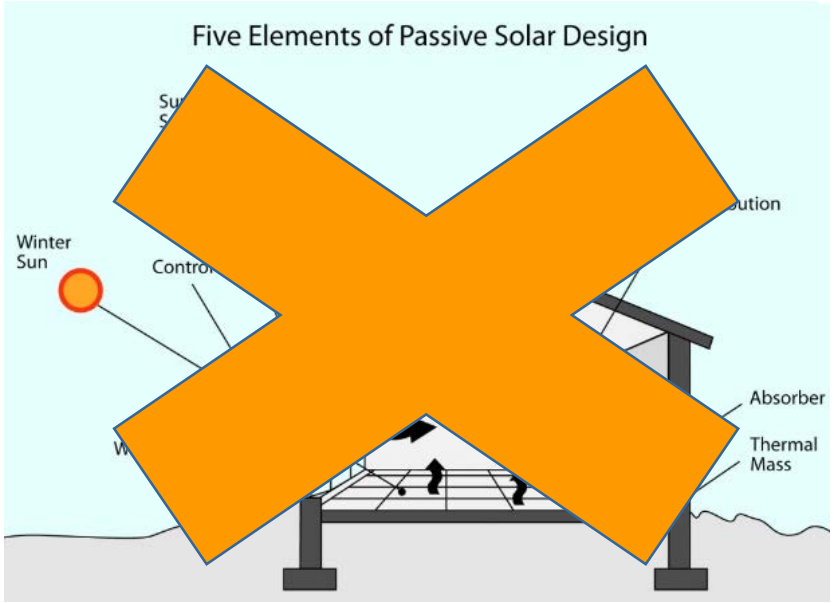
  - Active vs. Passive energy (e.g. passive heating building)



Data collection challenges

- Boundaries and definitions
  - Inclusion of primary product (e.g. liquid biofuels and biogases)
  - Active vs. Passive energy (e.g. passive heating building)
  - Energy vs. Non-energy application (e.g. natural hot source spa)

Data collection challenges

- **Scattered production/stocks/trade/consumption data**
  - Not all renewable and waste energies flow through conventional systems
    - *E.g. Individual consumption of firewood*
  - Multitude of individual small installations
    - *E.g. Stand alone PV*
- **Lack of standardized estimation methodology**
  - Alternative data sources
  - Sales figures used for capacity
  - Using average energy efficiencies
  - Assumptions on consumption requirements (households…)

Approaches to collect data on renewables in different countries

Data collection – Administrative data

- Administrative data can be used for:
  - Biogas (landfill gas, sewage sludge gas)
  - Energy crops
  - Solid biomass (non domestic wood, straw combustion, waste combustion)
  - Macro economic data (GDP) and Demographic data (population per dwelling…)
- For transport (blended biofuels):
  - When different tax levels are used for the bioenergy component, the information on the total volume can be obtained from the tax office
- Similarly with solar PV when feed-in tariff applies

Data collection – Surveys (1/5)

- **Industry:** surveys used for
  - Production and supply of heat and electricity
  - Consumption of fuels (included renewables) for heat and electricity production
  - Technical specifications of energy equipment used
  - Ideally stakeholders implicated in the design of the survey
- **Services:** similar to industry with often lower response rate reported

> **Need for precise specifications of the products/sectors used**

Data collection – Surveys (2/5)

- **Residential:**
  - Voluntary or mandatory surveys on the use of energy
  - Collects information on
    - the basic characteristics of households;
    - sources of energy supply;
    - expenditure on energy;
    - consumption levels of various energy commodities (e.g. electricity, LPG, firewood, charcoal among others);
    - information on appliances usage;
    - frequency and duration of supply & usage;
  - Sent to a representative sample of households

Data collection – Surveys (3/5)

Residential:

- Data validation procedure – examples of checks (Austria)
  - Electricity has to be reported
  - At least one fuel has to be reported for each of: space heating; water heating; cooking
  - The type of heating system must be compatible with the main fuel used for space heating
  - The age of the building must not conflict with the heating systems age
  - Prices need to be within realistic ranges
- Data validation procedure – examples of checks (France)
  - Fuel quantities must be realistic (compared to size of dwelling)

Data collection – Surveys (4/5)

- **Residential:**
  - Computation (example Austria)
    - Total energy consumption calculated as sum of all fuel consumed in household
    - Then disaggregated based on modeled demand for space / water heating and cooking (parameters to be designed and tested).
    - Comparison and correction

End-Use Category	Nr. of Persons in the Household	Energy Demand	
		[kWh]	[GJ]
Water Heating [1]	pro Person	1199	4,3164
Cooking [2]	1	375	1,35
Cooking [2]	2	475	1,71
Cooking [2]	3	544,444	1,96
Cooking [2]	4	713,889	2,57
Cooking [2]	5 and more	883,333	3,18

[1] assumed as linear function [2] assumed as a non-linear function;

Data collection – Surveys (5/5)

- **Residential:**
  - Additional information used to verify data (example of Austria)
    - Number of gas meters attributed to households (customer register of natural gas suppliers)
    - Building register (type and age of buildings on regional level)
    - Population register
    - Number of installed wood chip boilers <=80kW
  - Additional information used to verify data (example of France)
    - Breakdown of dwellings by type of heating system and by main fuel used for heating must be consistent with the same data coming from the General Census

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