ITALIAN NATIONAL AGENCY
FOR NEW TECHNOLOGIES, ENERGY AND
SUSTAINABLE ECONOMIC DEVELOPMENT

Biomass Inventories in Europe

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Objective

To provide information on the type and amount of biomass in Europe/India that can be utilized for the production of energy, materials and chemicals.

Methodology

Merging existing information on biomass resources into a new free accessible database

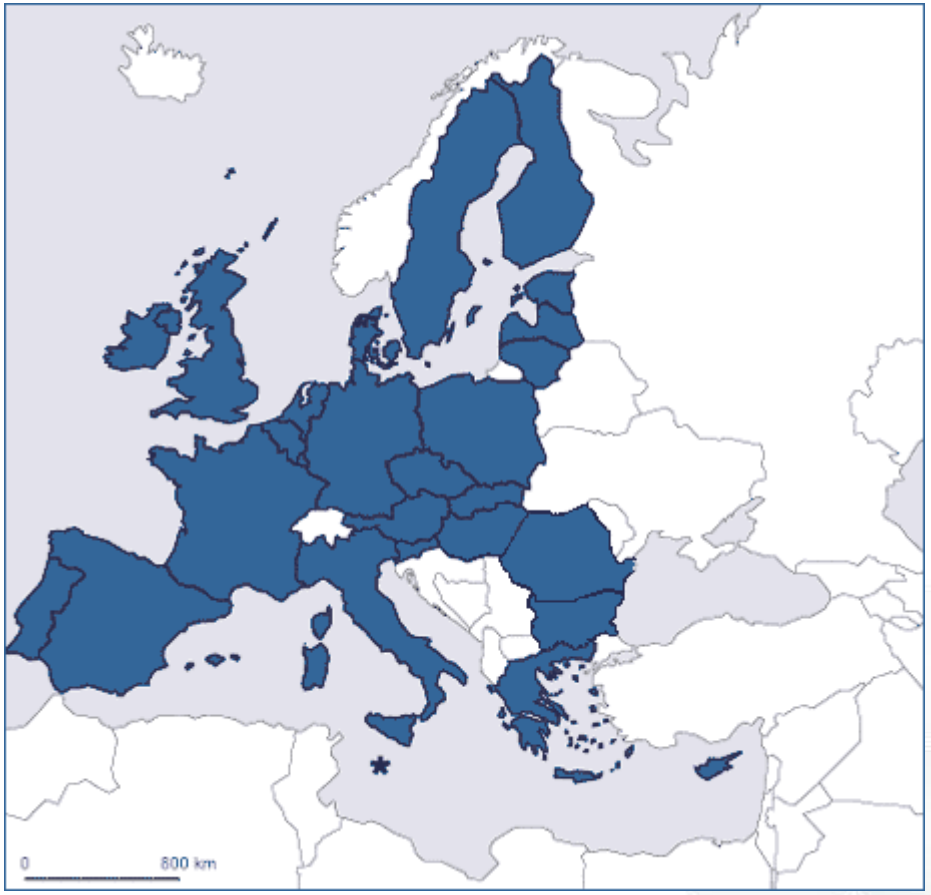
Steps:

- ✓ **Determination of the database structure**
- ✓ **Analysis of the information sources**
- ✓ **Filling of the data in the database**

Database structure

Excel database

27 EU Countries



Biomass categori

1. Biomass from forestry
2. Biomass from agriculture and fisheries
3. Biomass from waste

1. Agricultural crops and fishery products directly provided for energy, materials and chemical production

Optional-if information is available you can further details

a) oil crops

b) sugar crops

b) starch crops

c) short rotation trees

d) other energy crops (grasses)

e) algae

f) other (plea

2. Agricultu … es and fishery by-p… chemicals p…

Optional-if i… …her details

a) straw

b) waste oils

c) animal fat

d) manure

e) meat and …

f) cake by–p… and olive oil…

g) fruit biom… kernel)

h) fishery by…

i) clippings f…

l) other (please define)

1. Biodegradable fraction of municipal solid waste including biowaste (biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises, and comparable waste from food processing plants)

2. Biodegradable fraction of industrial waste (including paper, cardboard, pallets)

3. Sewage sludge

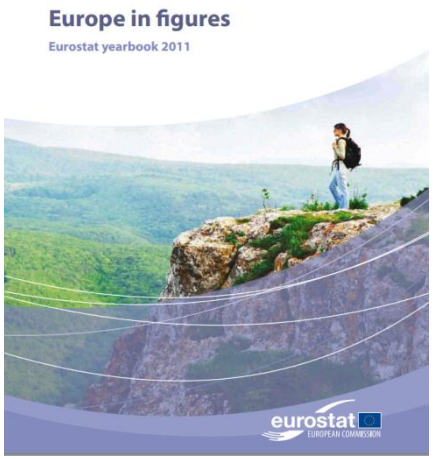
4. landfill gas

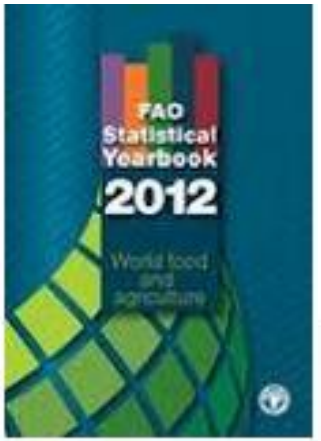
Type of information

- **Total available biomass**
- **Used biomass**
- **Net biomass potential**
- **Energy content of total available biomass**
- **Source/link**
- **Reference year**
- **Notes**

Main consulted databases

- FAOSTAT
- EUROSTAT
- NREAP
- AEBIOM
- EUBIONET III
- BIOMASS FUTURES





BIOMASS FUTURES

Which data in the database?

- Data on domestic availability of biomass and biowaste
- Reference years: mainly 2010-2011
- Phyllis database (www.ecn.nl/phyllis/) used to calculate energy content
- No import and export data

Constraints

- Lack of a consensus on the meaning and use of different biomass potentials

- AEBIOM and EUBIONET: it is not always clear which potential is reported

- Lack of homogeneity of measure units among the different countries, low coherence within and among datasets

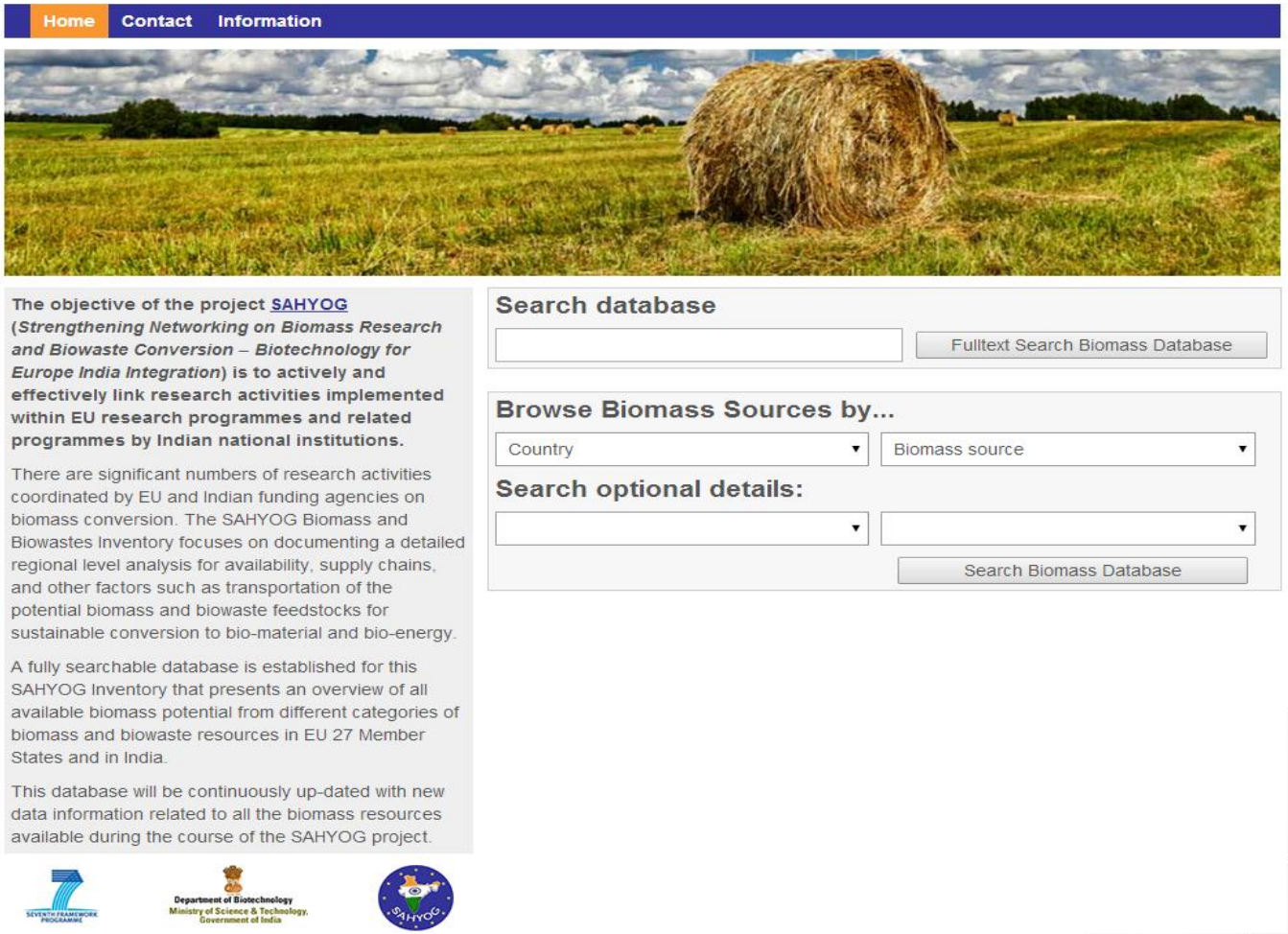
- Lack of data: most datasets only partially compiled

Technical potential: *"the fraction of the theoretical potential, which is available under the regarded techno-structural framework conditions and with the current technological possibilities. Spatial confinements due to competitions with other land uses as well as ecological and other non-technical constraints are also taken into account"*

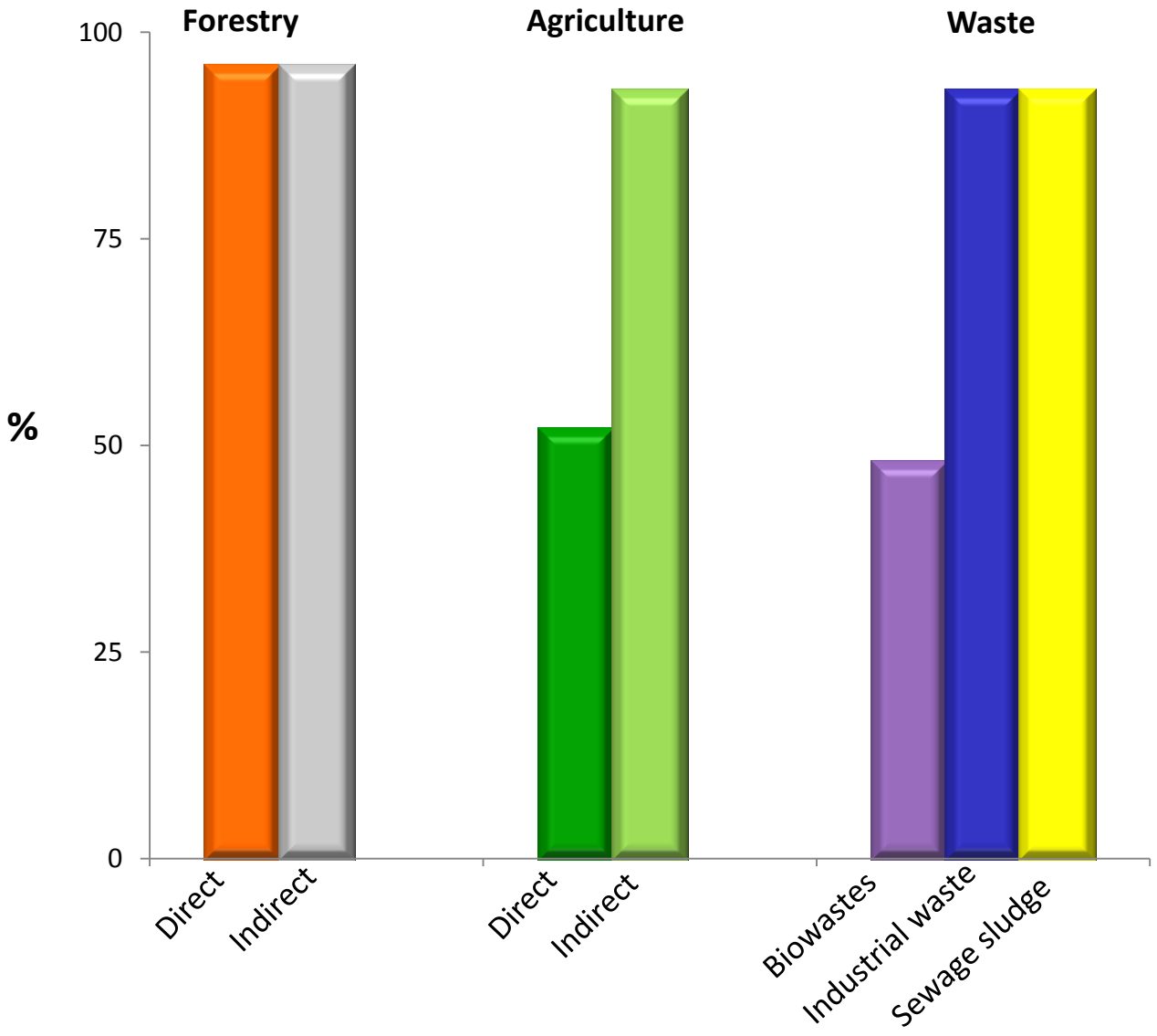
Rettenmaier N et al., Status of biomass resources Assessment, Version 3 Freiburg, Germany, University of Freiburg

RESULTS

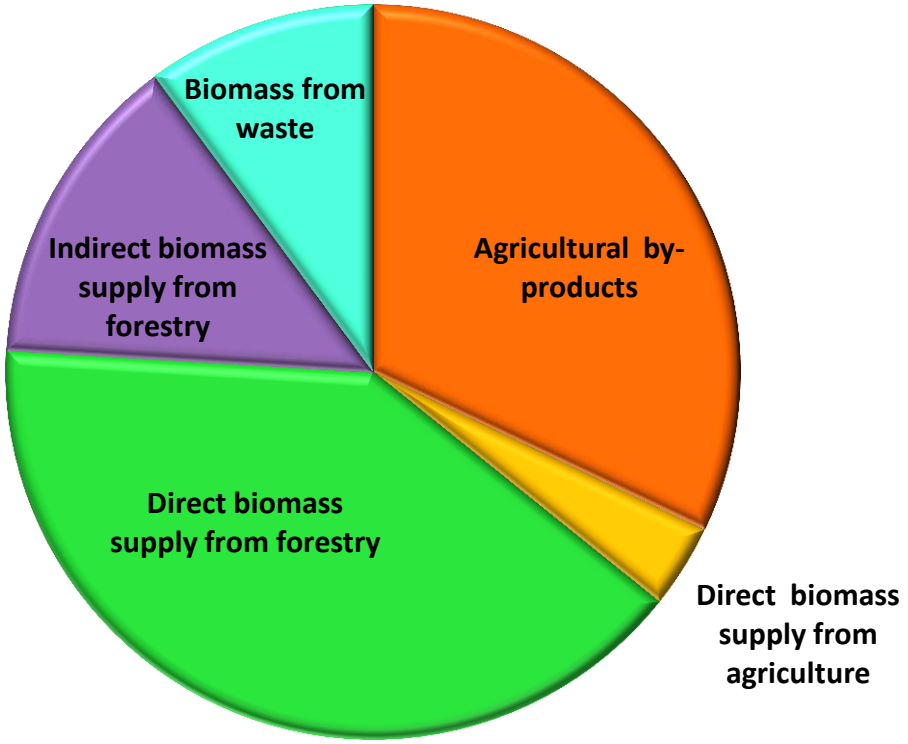
http://www.sahyog-biomass-database.eu/



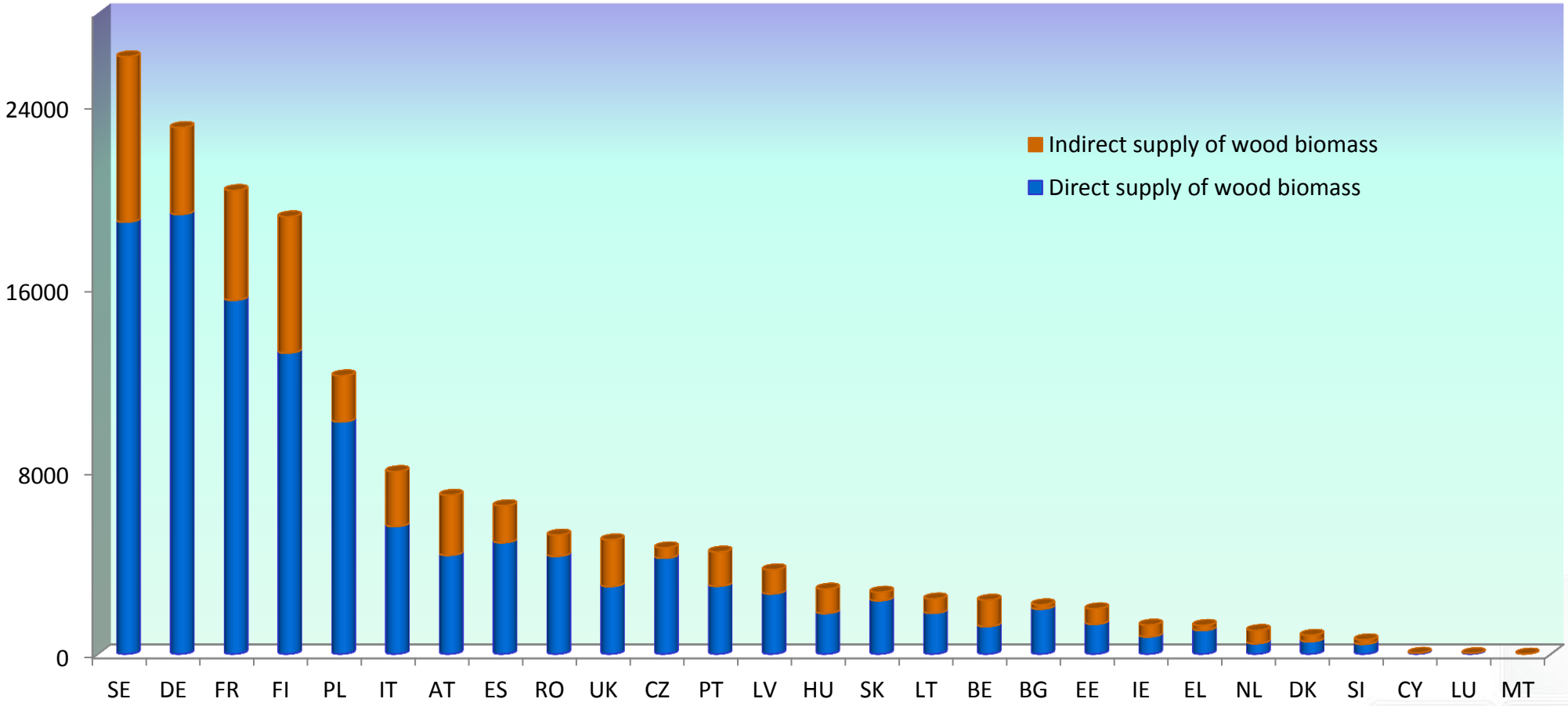
Completed datasets



Availability of different types of biomass in EU 27 (ktoe)



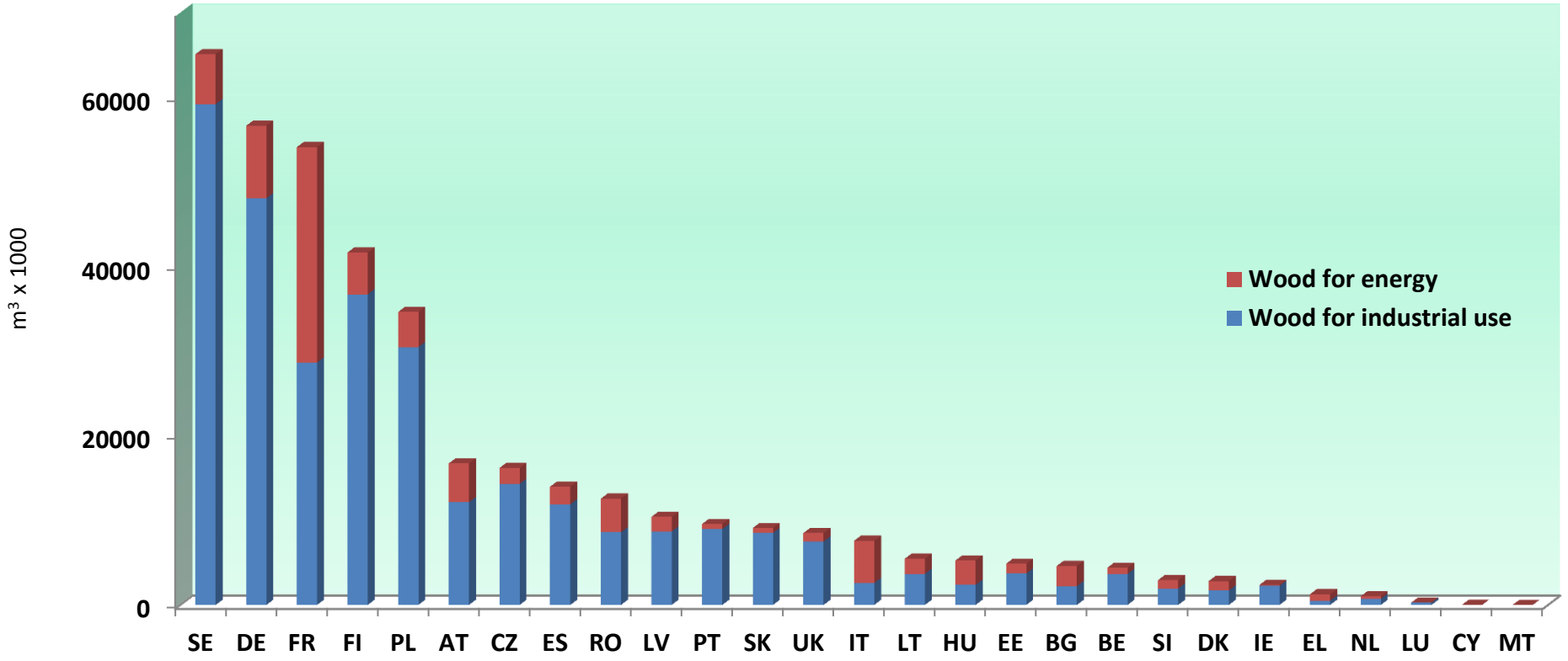
Direct and Indirect supply of woody biomass from forestry (ktoe)



Most forestry biomass comes from Sweden, Germany, France, Finland and Poland

Most biomass potential comes from direct sources of woody biomass

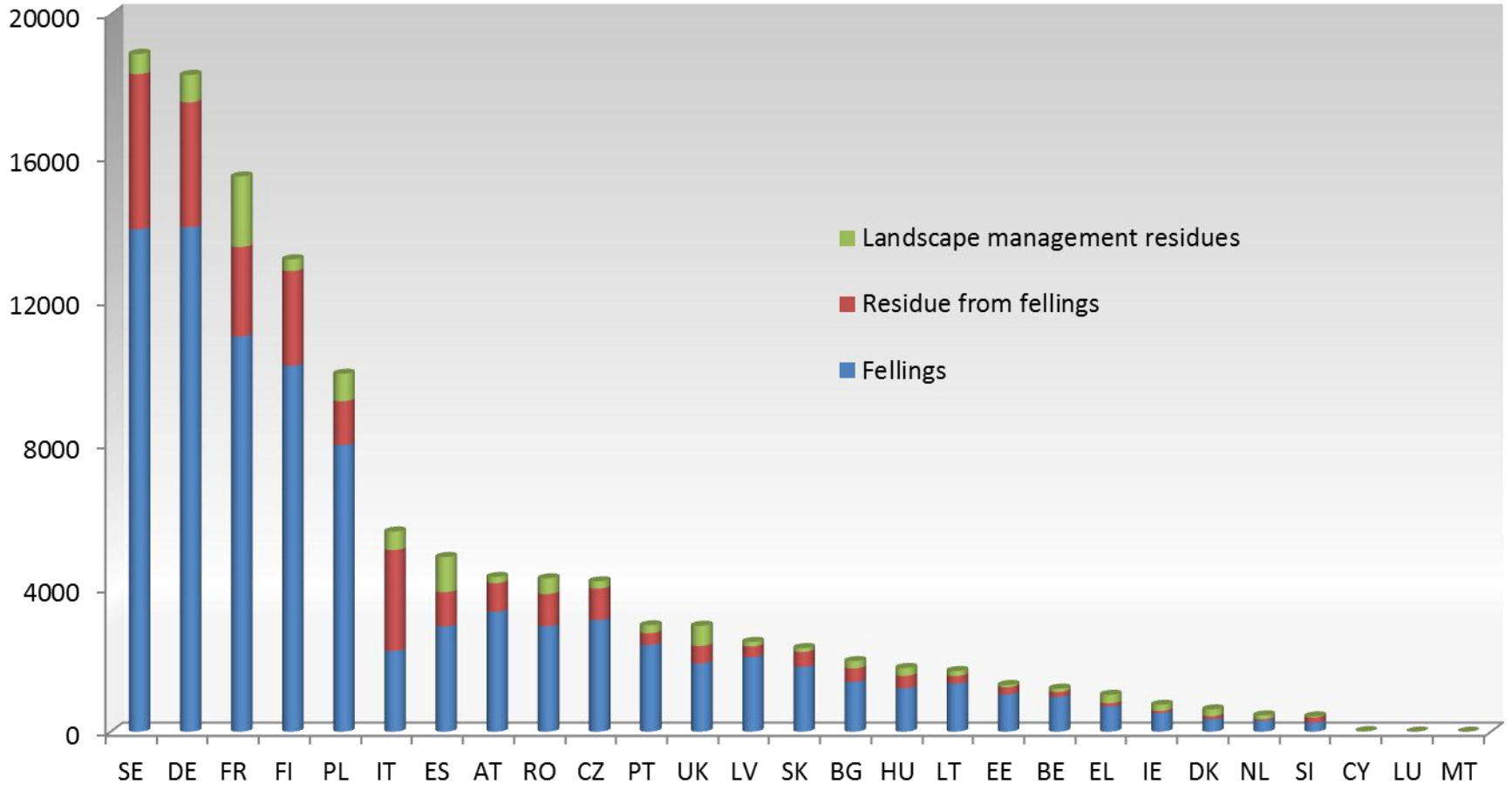
Rounwood production for industrial and energy uses



Most roundwood production has a primary industrial designation

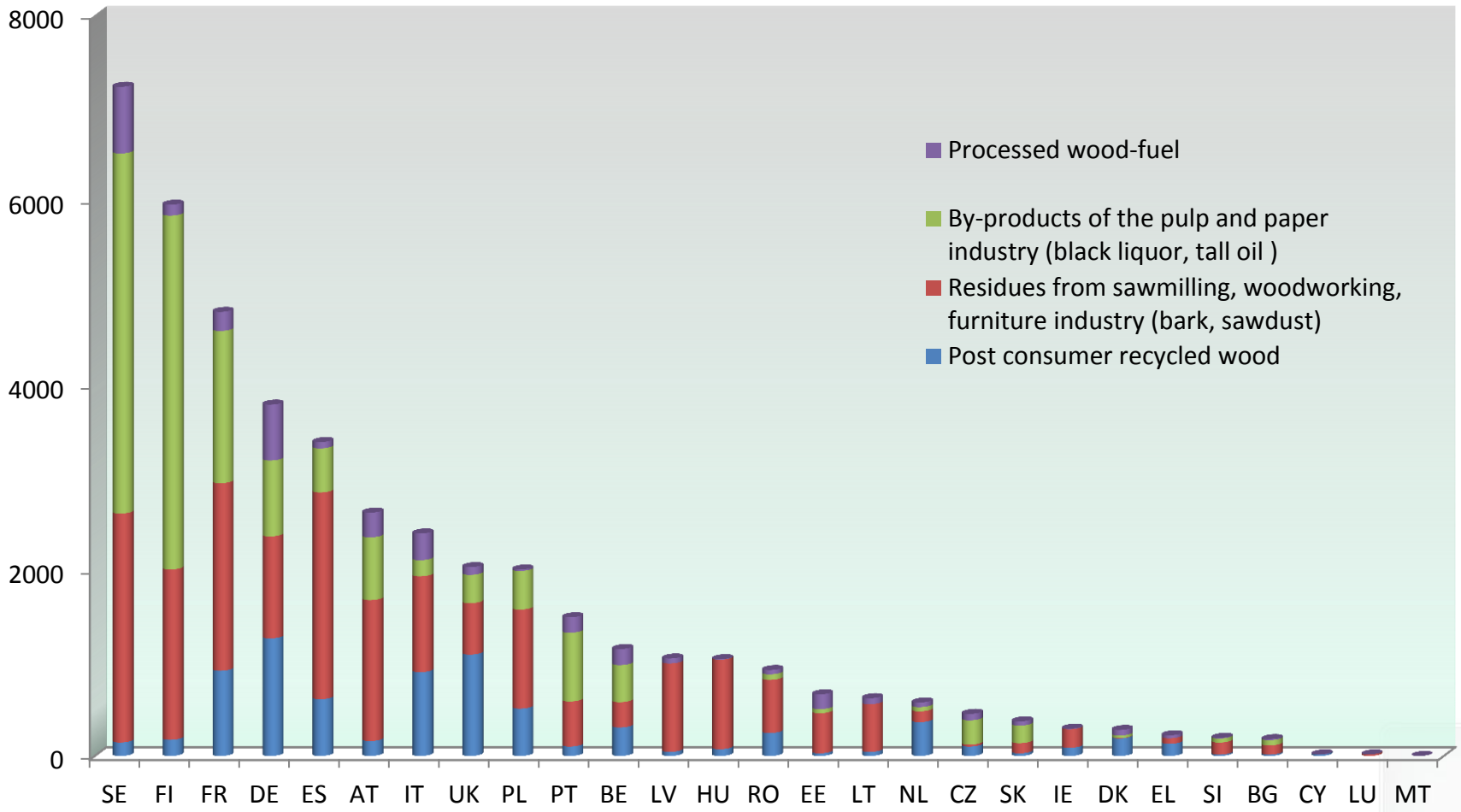
France is by far the country with the highest amount of roundwood used for energy.

Direct supply woody biomass from forestry (ktoe)



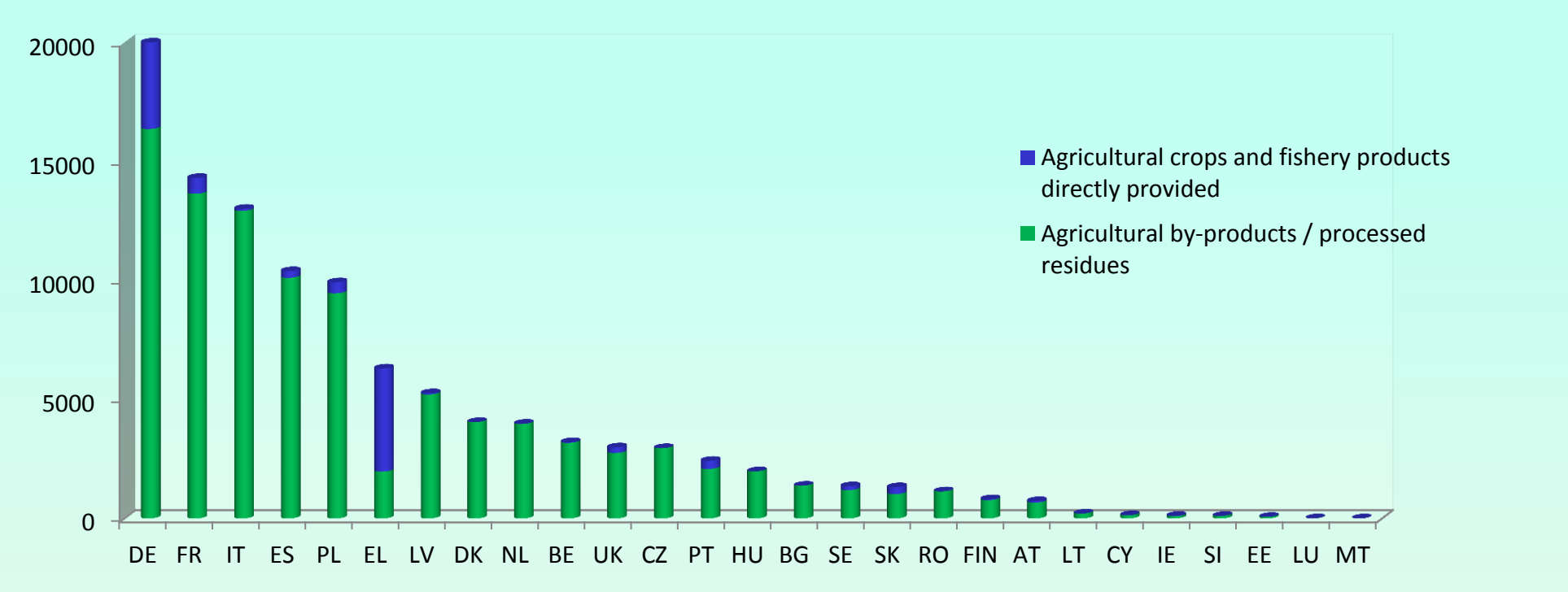
The potential biomass from landscape care wood is relatively higher in those countries not having a large forest sector like Netherland, Denmark, Cyprus, Greece and United Kingdom

Indirect supply woody biomass from forestry (ktoe)



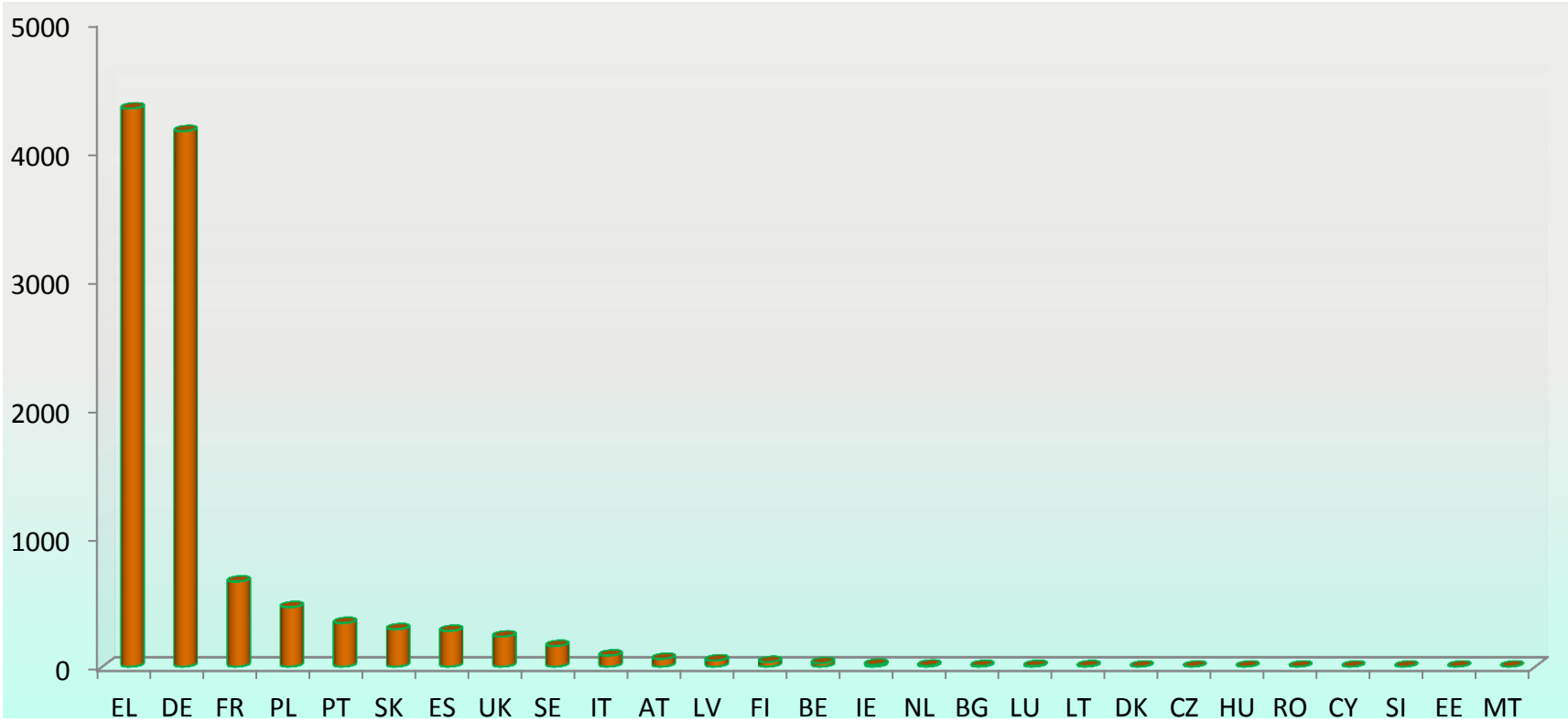
Germany, Italy, Netherland, United Kingdom, Denmark, Greece and Cyprus show relatively higher potentials of post consumer wood

Biomass directly and indirectly provided from agriculture (ktoe)



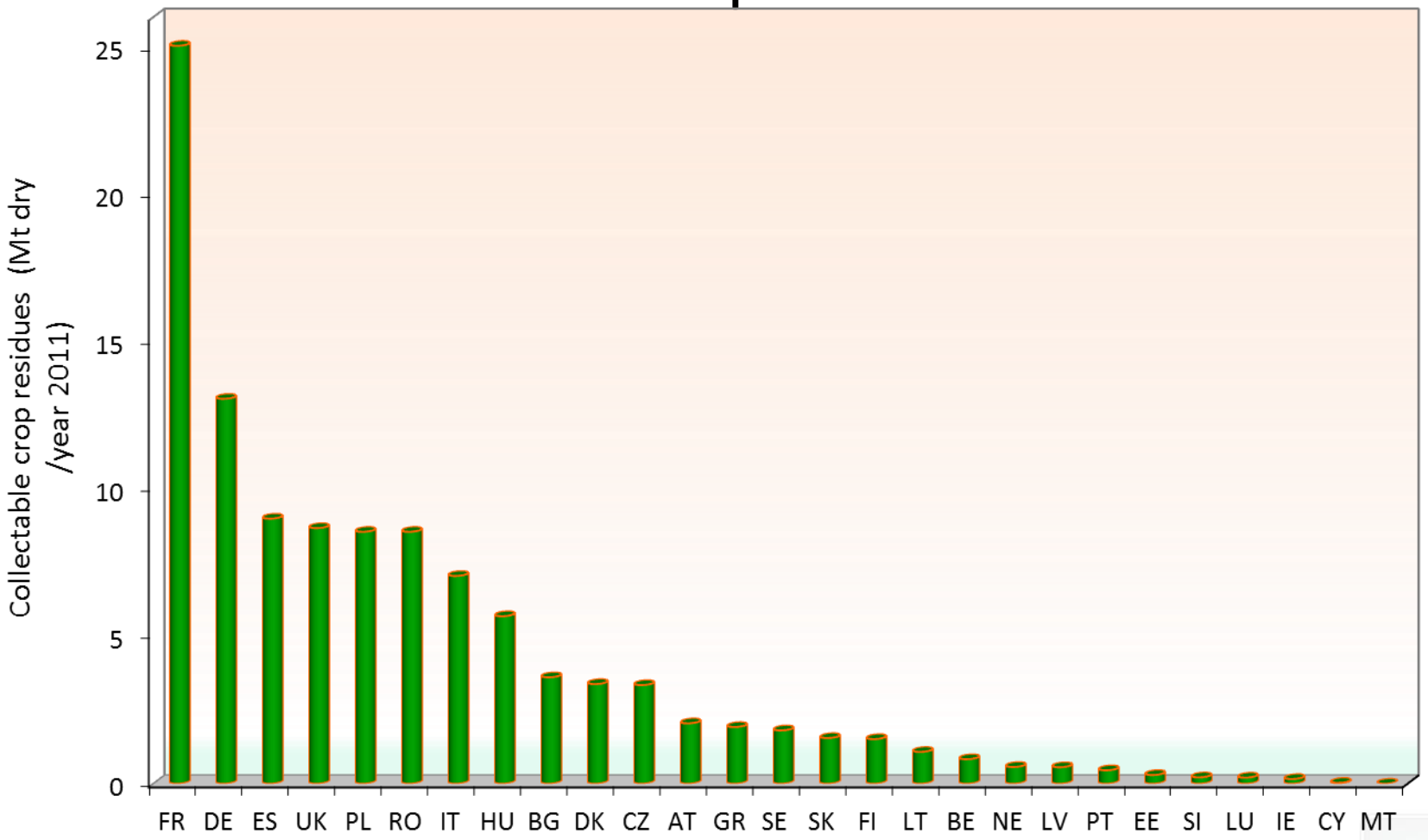
Availability of agricultural by-products for energy production is 10-100 times higher than that of directly provided agricultural products (mainly energy crops)

Energy crops (ktoe)



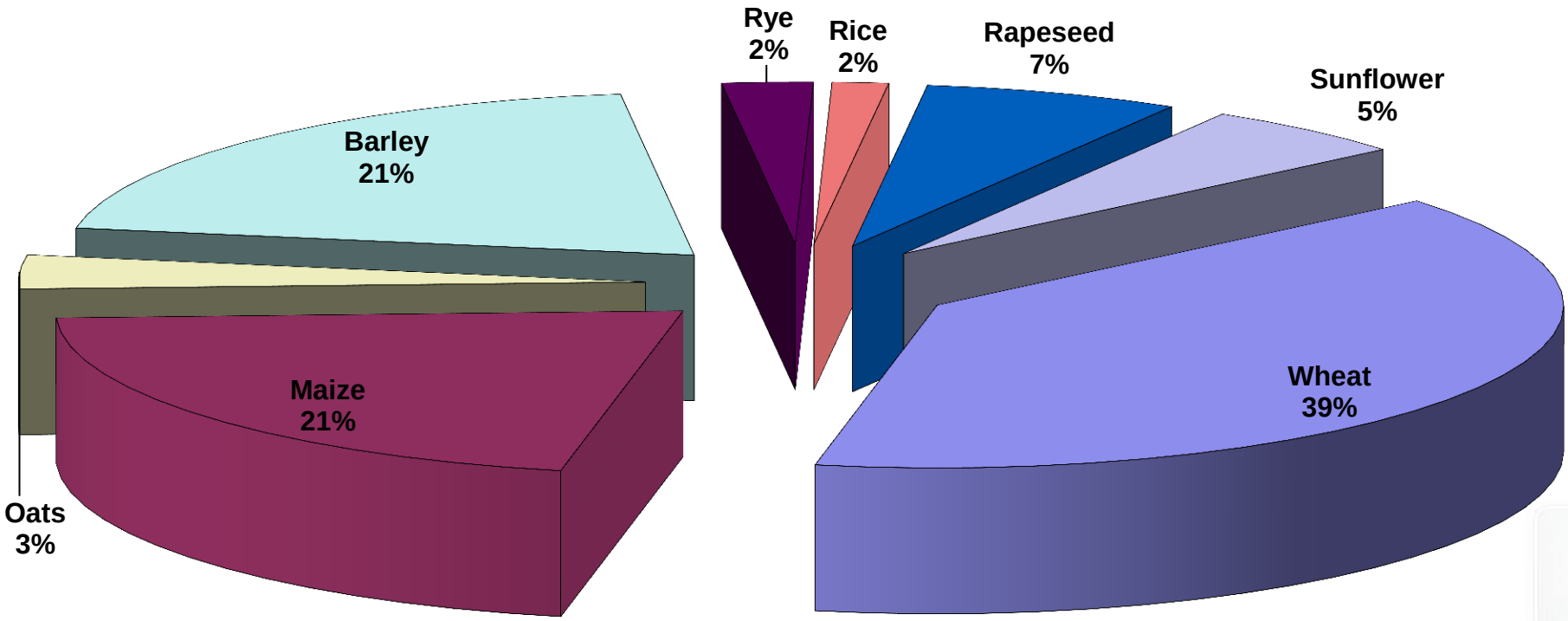
Dedicated energy crops consist mainly of grasses cultivation, such as reed canary grass, rapeseed, switchgrass and *Miscanthus*, although the current market demand for biofuels is covered mostly by conventional crops like oilseeds and grains with limited quantities from lignocellulosic energy crops which are mainly used for heat and electricity

Production of crop residues in EU 27

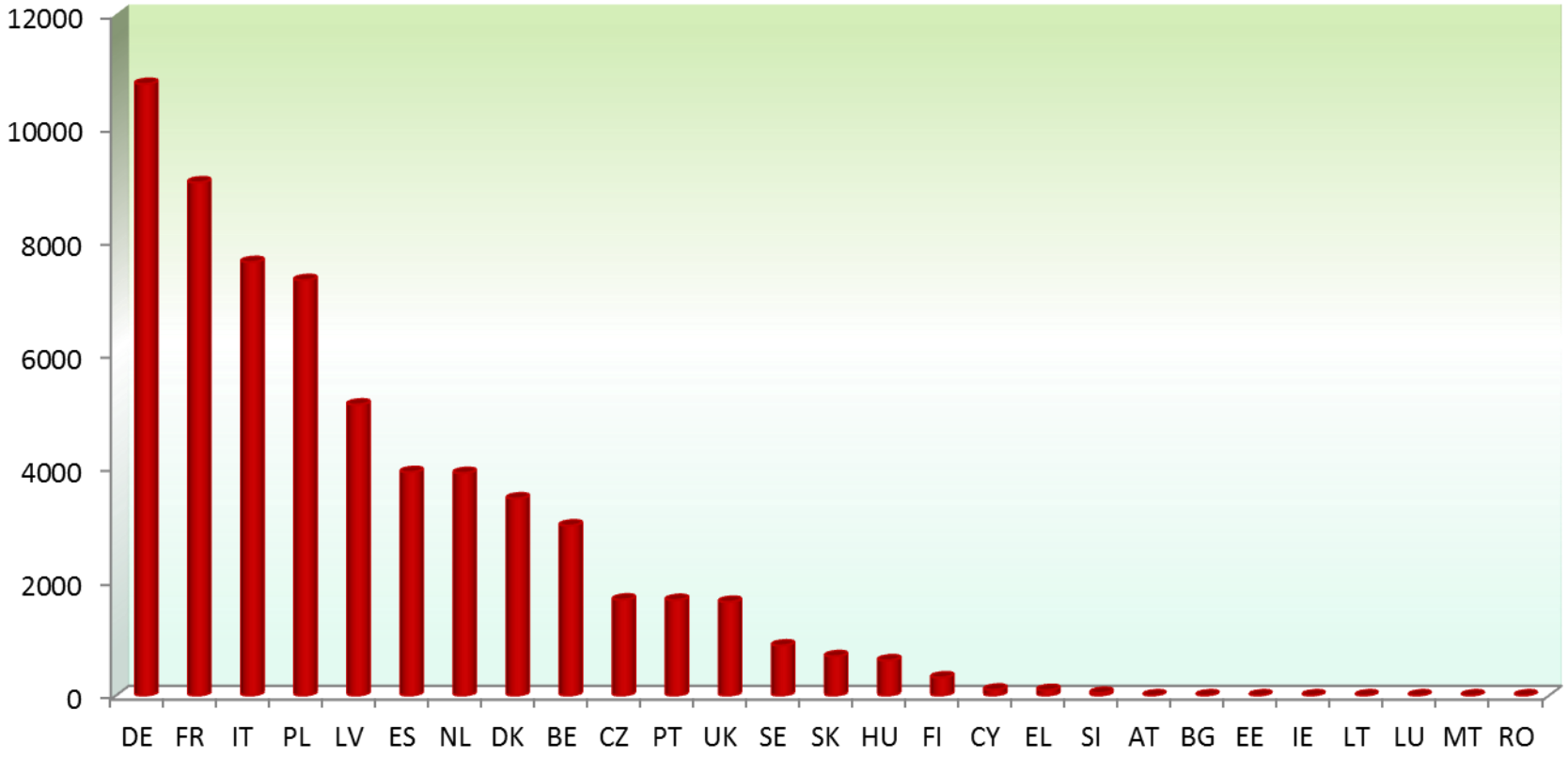


Most crop residues are available in France, Germany, Romania, Spain, Italy, Hungary and Poland, which have a large agricultural sector

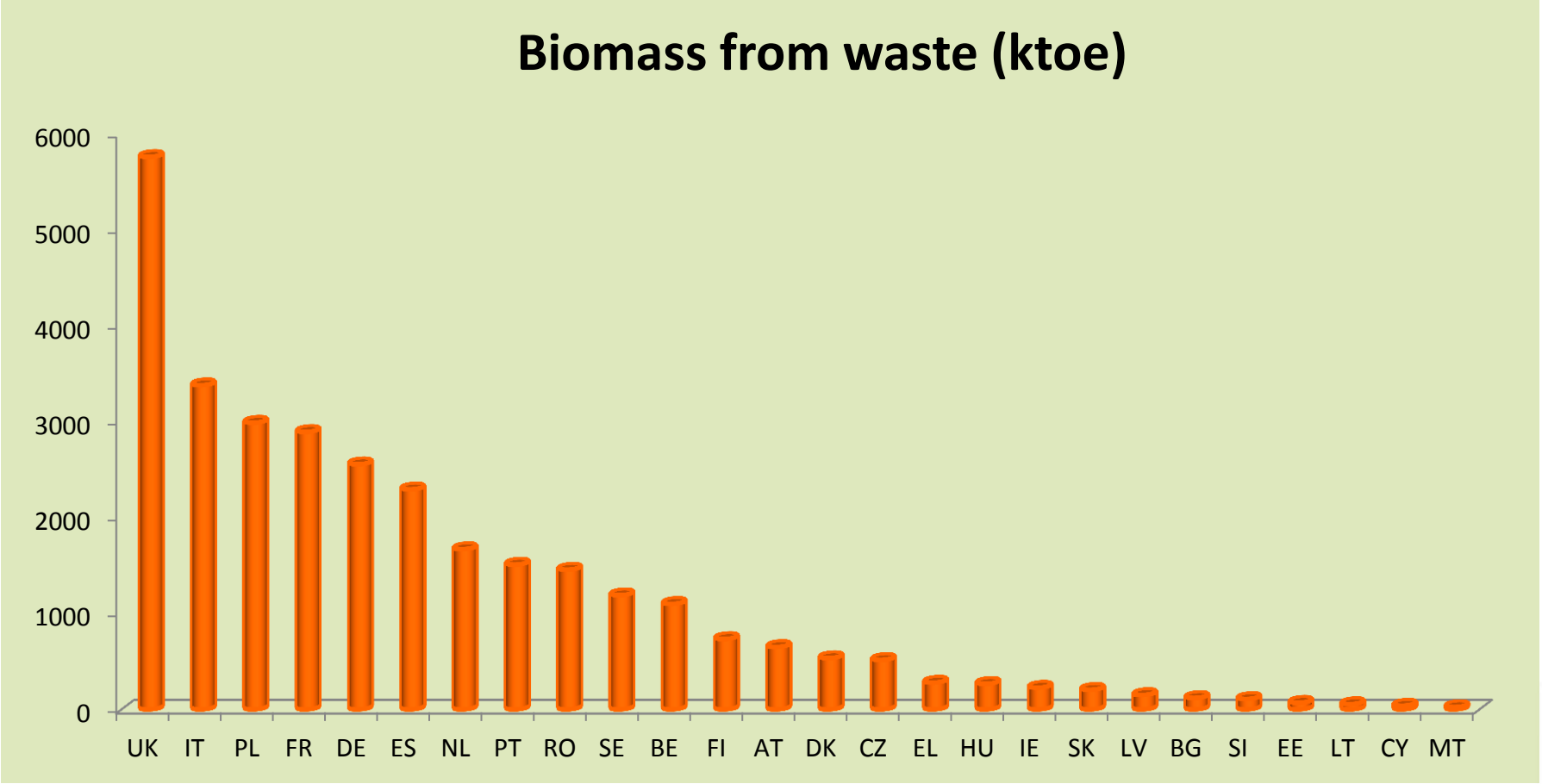
Share of crop residues produced in EU27 year 2011



Potential from manure (ktoe)

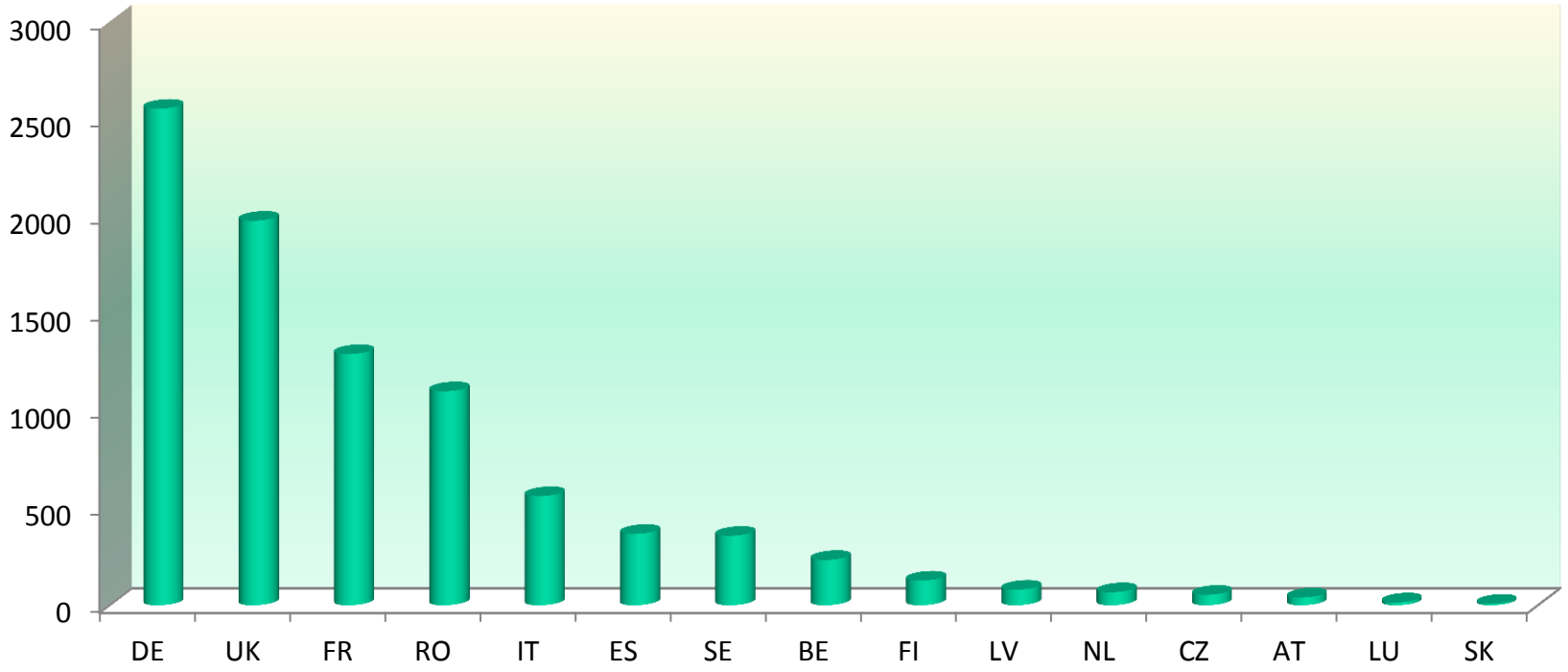


Manure is the most abundant source of biomass among agricultural by-products amounting to an annual production three-fold higher than that of crop residues



Bulgaria, Cyprus, Denmark, Estland, Greece, Hungary, Ireland, Lithuania, Malta, Poland, Portugal and Slovenia lack data of biodegradable fraction of municipal solid waste including food and kitchen waste from household, restaurants, caterers and retail premises, waste from food processing plants

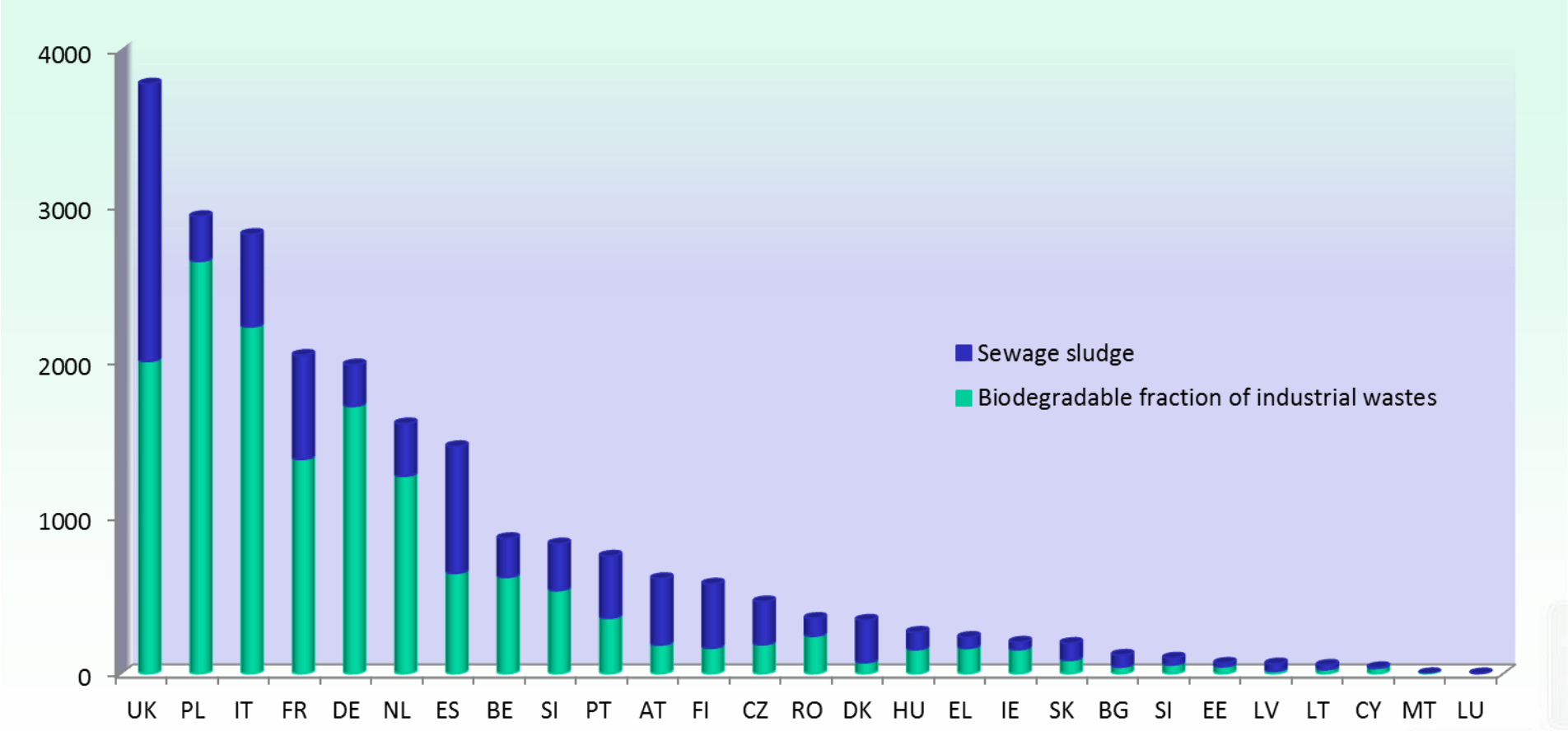
Biowaste (ktoe)



Biowaste: biodegradable fraction of municipal solid waste, food and kitchen waste from household, restaurants, caterers and retail premises, waste from food processing plants

Consulted database lack data on biowaste for several EU countries

Potential from sewage sludge and biodegradable fraction of industrial waste (ktoe)



- Biodegradable fraction of industrial waste includes "fibre, filler and coating rejects from pulp, paper and cardboard production ". It's origin is either from pulp and paper industry and separate collection of waste, e.g., from households, industry, offices.
- Most potential from sewage sludge concentrated in UK, France, Italy and Spain

Remarks

- In EU 27 most biomass available for energy, materials and chemicals production originates from forestry
- Waste is the less abundant biomass resource in EU 27
- Most biomass potential comes from direct sources of woody biomass and is dedicated to industrial uses
- Availability of agricultural by-products for energy production is 10-100 times higher than that of directly provided from agricultural products (mainly energy crops)
- Manure and crop residues constitute the most abundant source of biomass for bioconversion to energy among agricultural by-products, manure amounting to an annual production three-fold higher than that of crop residues
- A great part of the available biomass from forestry, agriculture, and biowaste remains unexploited.

Thanks for the attention!

ENEA Working Group

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