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# Status of bioenergy implementation in the EU further to Renewable Energy Directive

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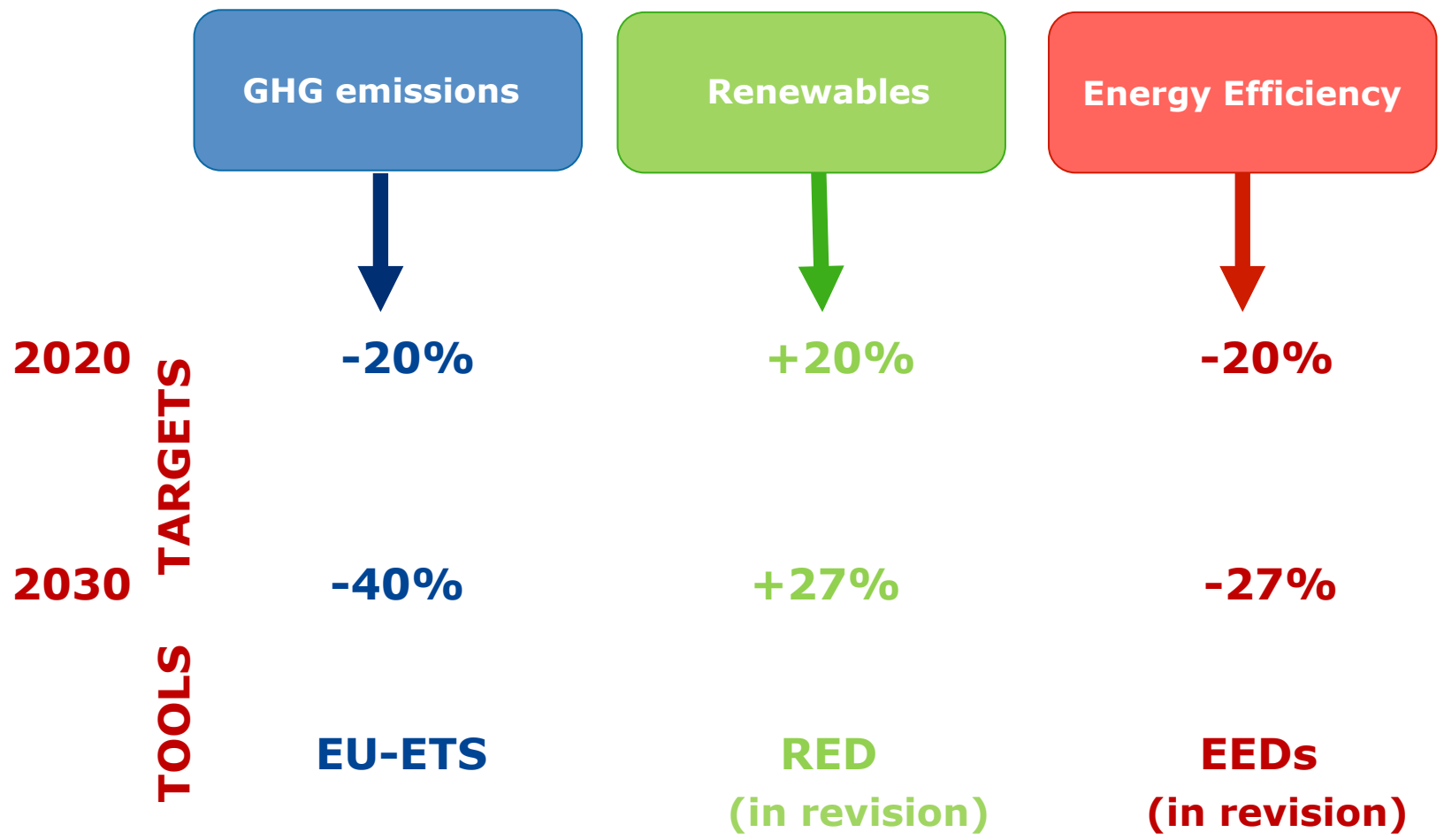
Energy Efficiency and Renewables Unit  
Directorate for Energy, Climate and Transport

Ispra, 22.11.2016

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# EU Climate and Energy Framework



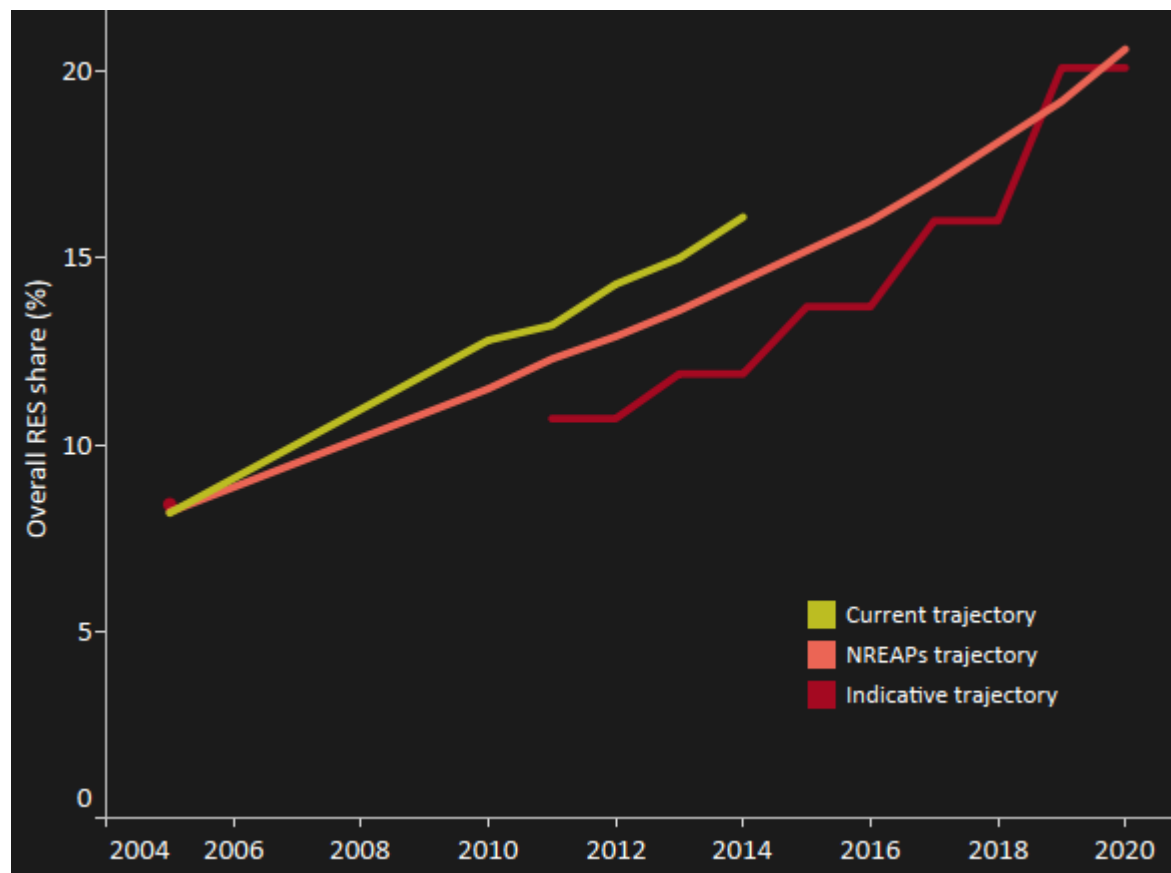
# Monitoring progress of renewables in EU

**In 2014**

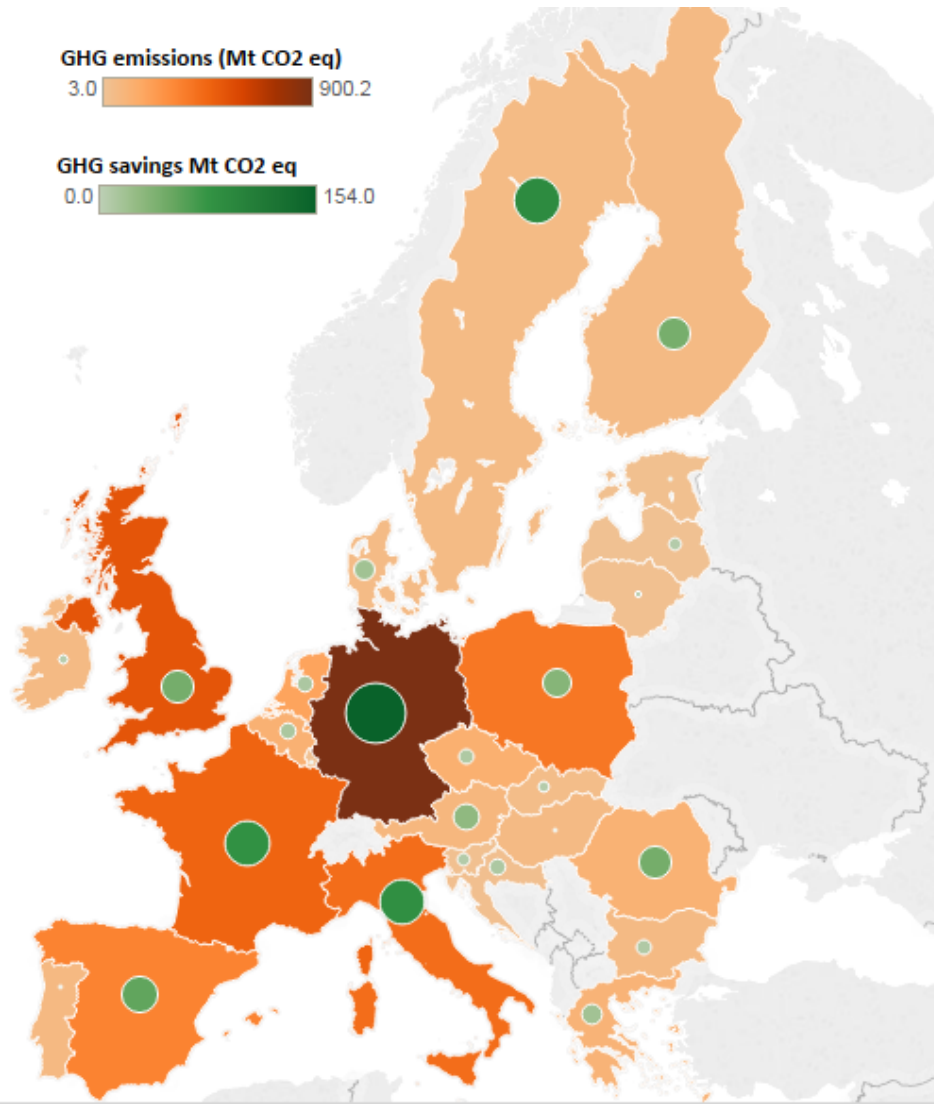
Overall RES share **16%**  
of Gross Final Energy  
Consumption

RES-E share **27.4%**  
RES-HC share **18.1%**  
RES-Tr share **5.6%**

Estimated to reach  
**16.4%** in 2015



## Impact of renewable energy in GHG emissions reduction



**767** Mt CO2 eq GHG emissions saved due to renewable energy in 2014

**5.1%** increase of GHG savings from 2013

**67%** saved due to renewable electricity in 2014

# Bioenergy policy framework in the EU

Renewable Energy Directive (RED)  
Fuel Quality Directive (FQD)

## Sustainability criteria in RED

Biofuels not from land with high carbon stock & high biodiversity  
Biofuels need to save at least 35% of GHG compared with fossil fuels, increasing to 50% in 2017

**In July 2014** Impact Assessment : State of play on the sustainability of biomass and biogas for electricity and heating/cooling

**Impact Assessment on Sustainability of Bioenergy** - in preparation

# Electricity from biomass is becoming more competitive

## Conventional technologies

LCOE 52-140 \$/MWh

## Combustion technologies

Biomass

LCOE 55-217 \$/MWh

Central scenario 120 \$/MWh

Waste

LCOE 48-128 \$/MWh

Central scenario 112 \$/MWh

## Biogas

## Biogas digestion

LCOE 27-210 \$/MWh

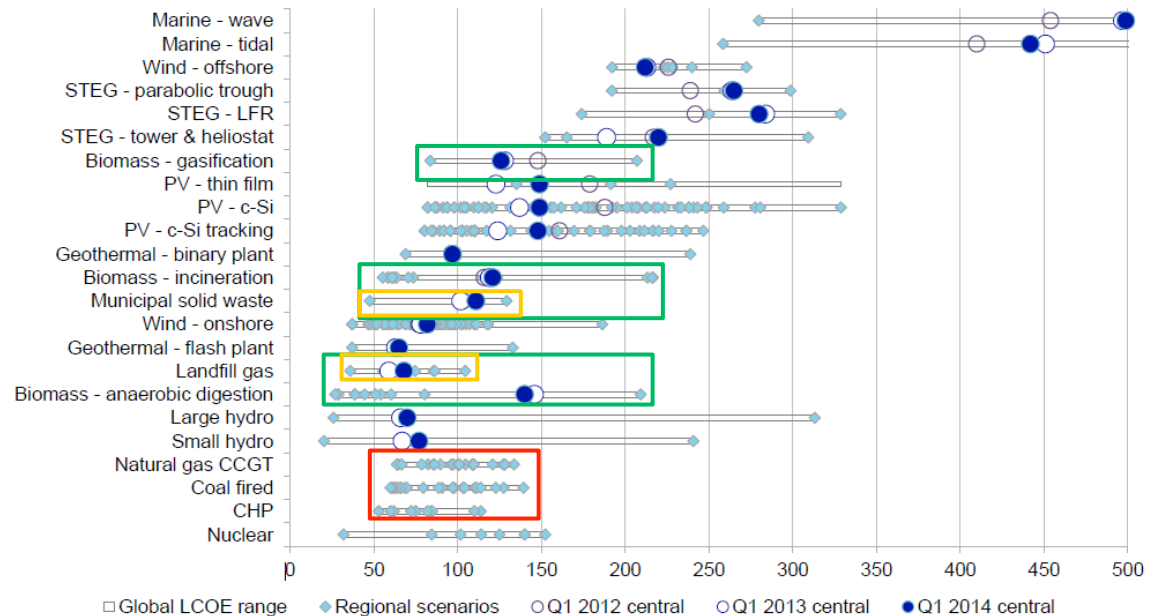
Central scenario 140 \$/MWh

## Landfill gas

LCOE 35-105 \$/MWh

Central scenario 70 \$/MWh

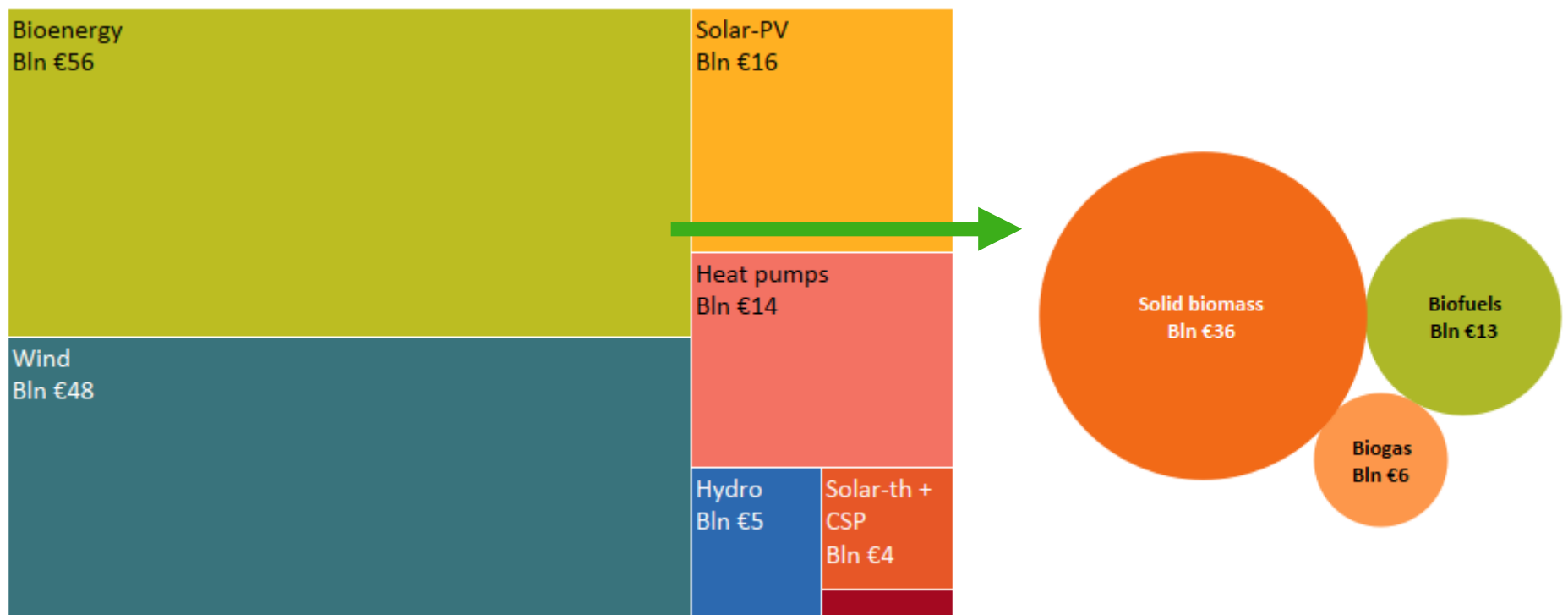
## LEVELIZED COST OF ELECTRICITY (LCOE) IN \$/MWh AT GLOBAL LEVEL



Source: Bloomberg New Energy Finance Note: Coal and natural gas prices from the US Department of Energy EIA Annual Energy Outlook. Note: 'STEG' means solar thermal generating capacity, 'CCGT' means combined cycle gas turbine and 'CHP' means combined heat and power.

## Bioenergy turnover in the EU

32% increase between 2010 and 2014  
 ~56 billion Euro in 2014  
 or 38.6% of turnover within RES  
 or 3.84% of turnover within Energy sector



# Bioenergy – leading renewable in the EU

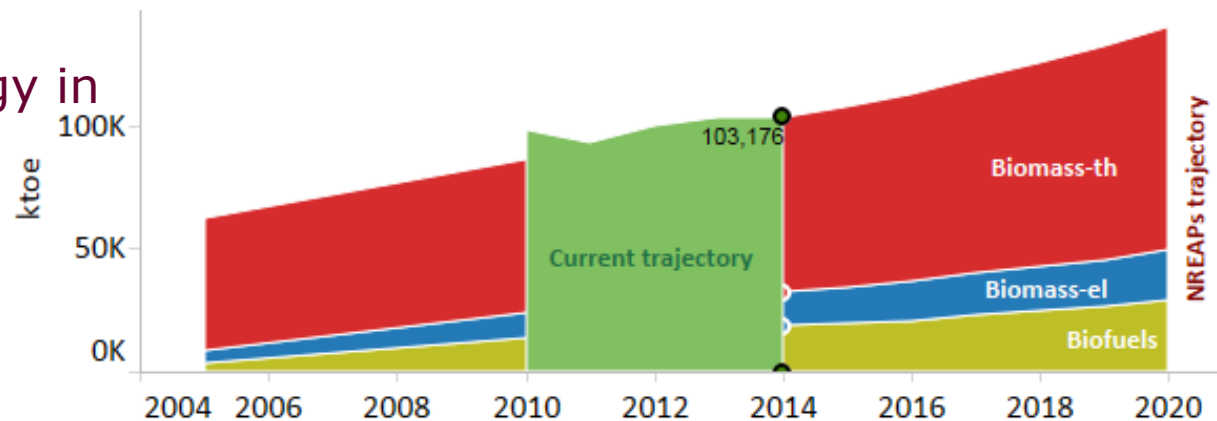
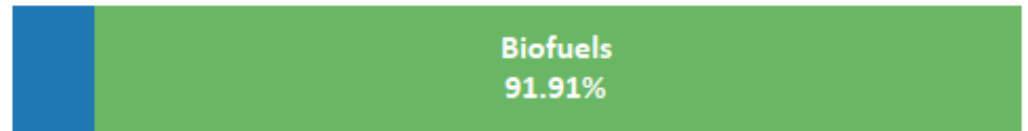
**In 2014**      **103.2 Mtoe**



~**60%** of final RES mix  
~**10%** of Gross Final Energy Consumption



~**19 %** of renewable electricity  
~**88%** of renewable heat  
>**90%** of renewable energy in transport





# Bioenergy – leading renewable in the EU

In 2014

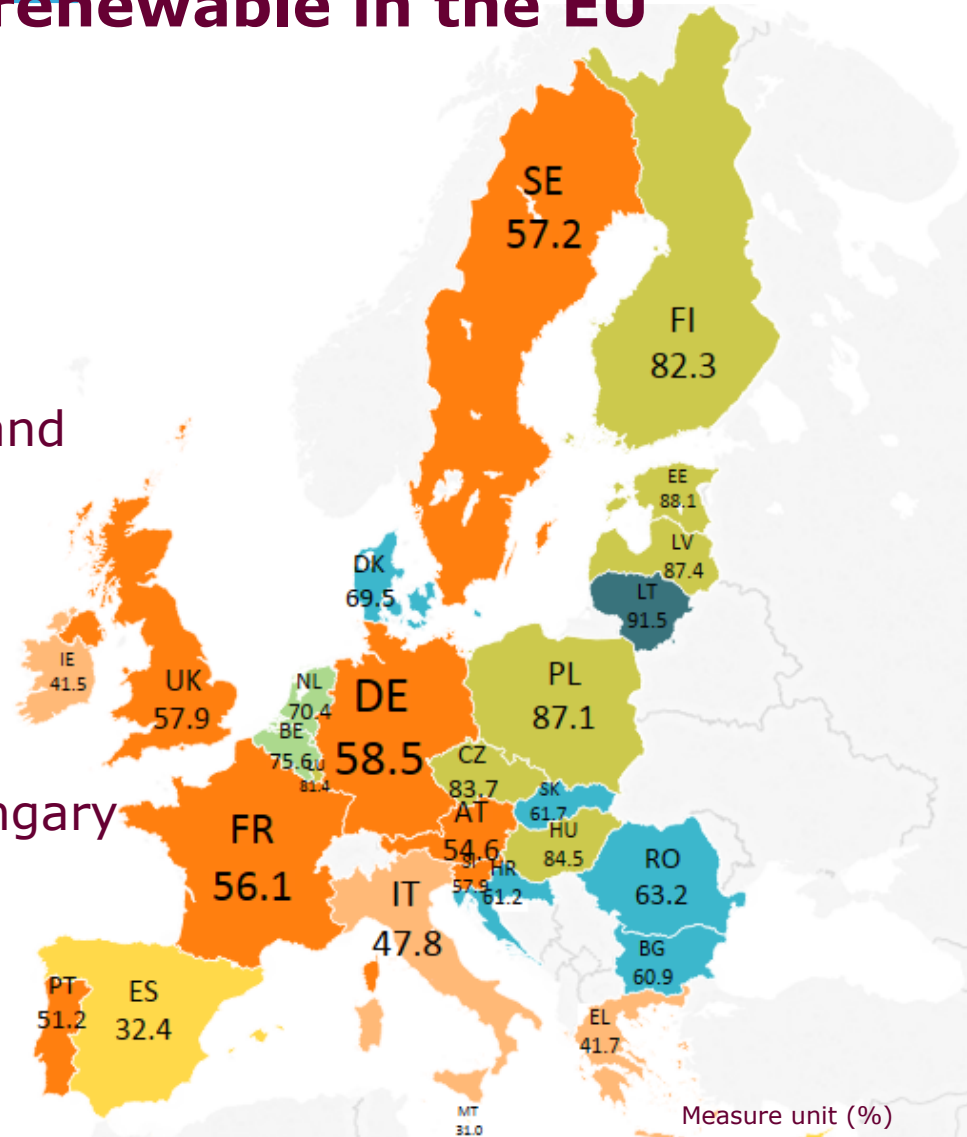
## Leading countries

Germany, France, Sweden, Italy, Finland

## Highest shares in final RES mix



Lithuania, Latvia, Estonia, Poland, Hungary



# Bioenergy – leading renewable in the EU

## In 2014

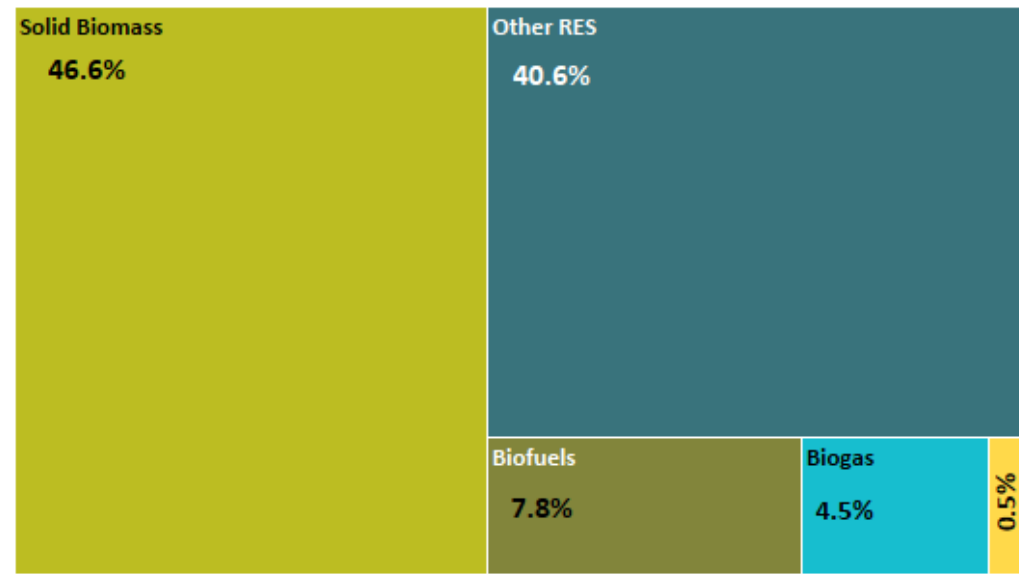
**>87%** was biomass (solid biomass + biogas + bioliquids)

**~74%** in Heating/Cooling sector

**>13%** in Electricity sector

**~13%** in Transport sector

**>37%** of bioenergy in households



**~ 47%** of RES was solid biomass

**>95%** of bioheat was solid biomass

**>60%** of bioelectricity was solid biomass

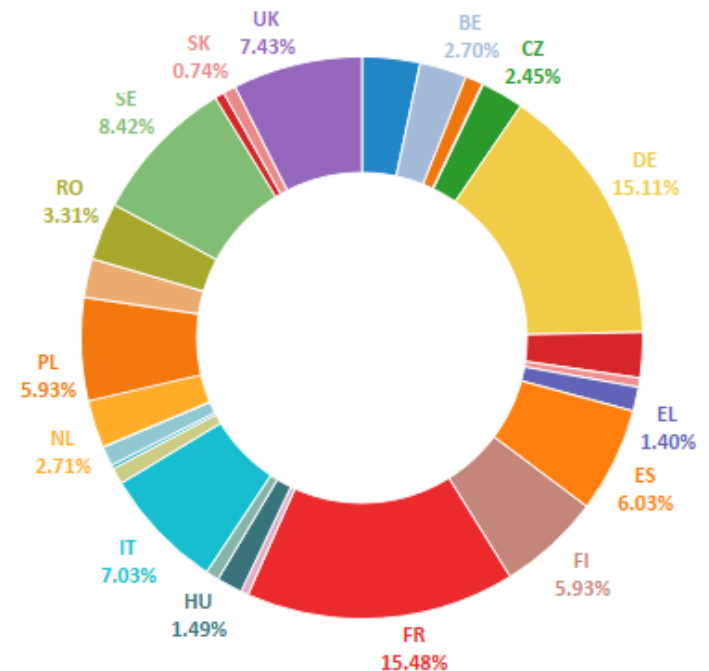
# Bioenergy – leading renewable in the EU

In 2020

>**56%** (139.5 Mtoe) of RES  
 Biomass ~**80%** of bioenergy  
 ~**65%** for Heating/Cooling sector

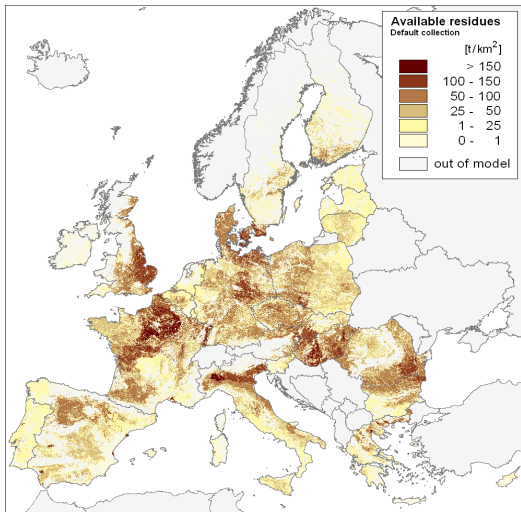


Solid biomass **38%** of RES  
 Solid biomass ~**90%** of bioheat  
 Solid biomass >**67%** of bioelectricity

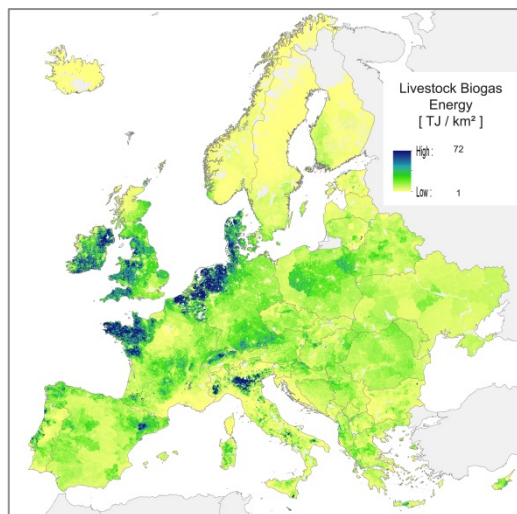


# Bioenergy – Resource Mapping

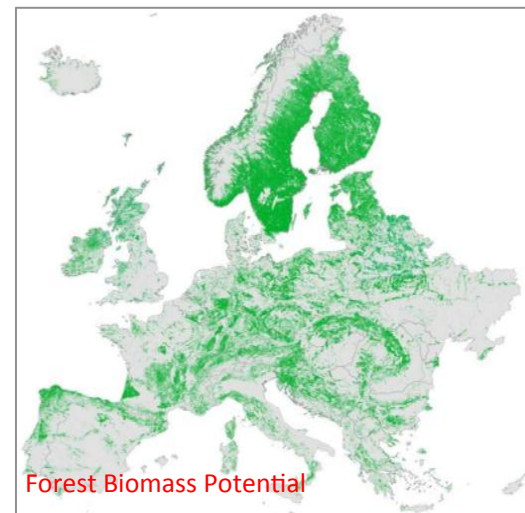
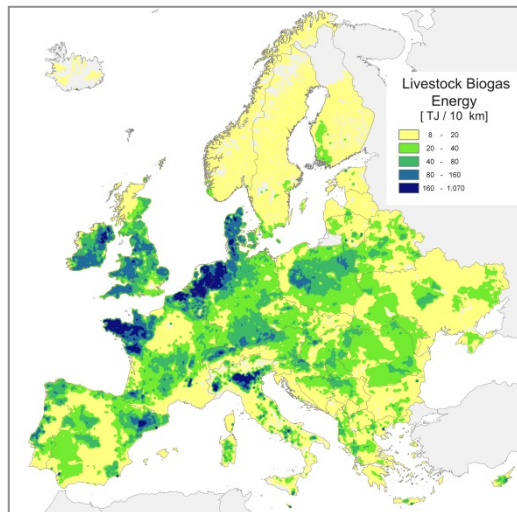
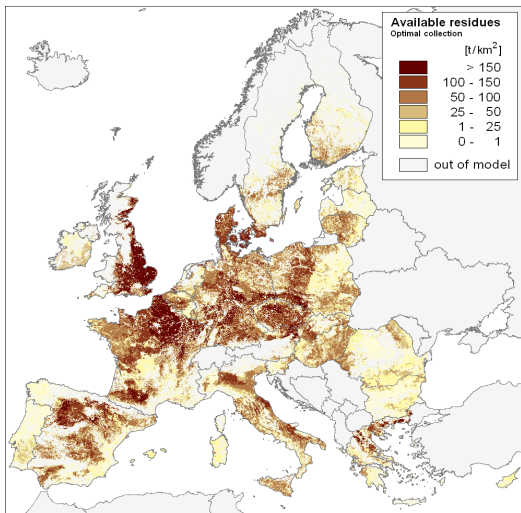
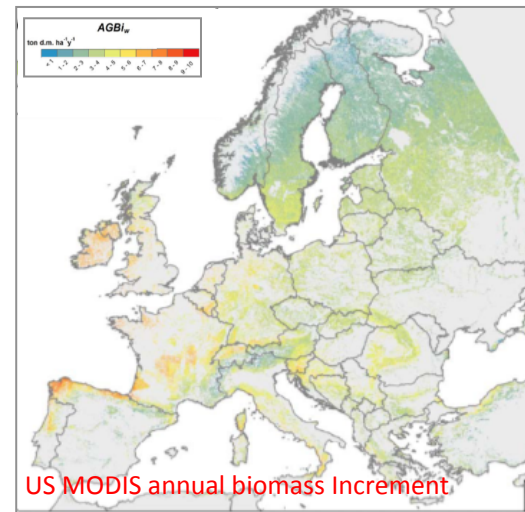
Crop residue production using default collection and SOC modelling



Biogas production using FAO spatial livestock distribution



Forest biomass potential statistic data, remote sensing & modelling



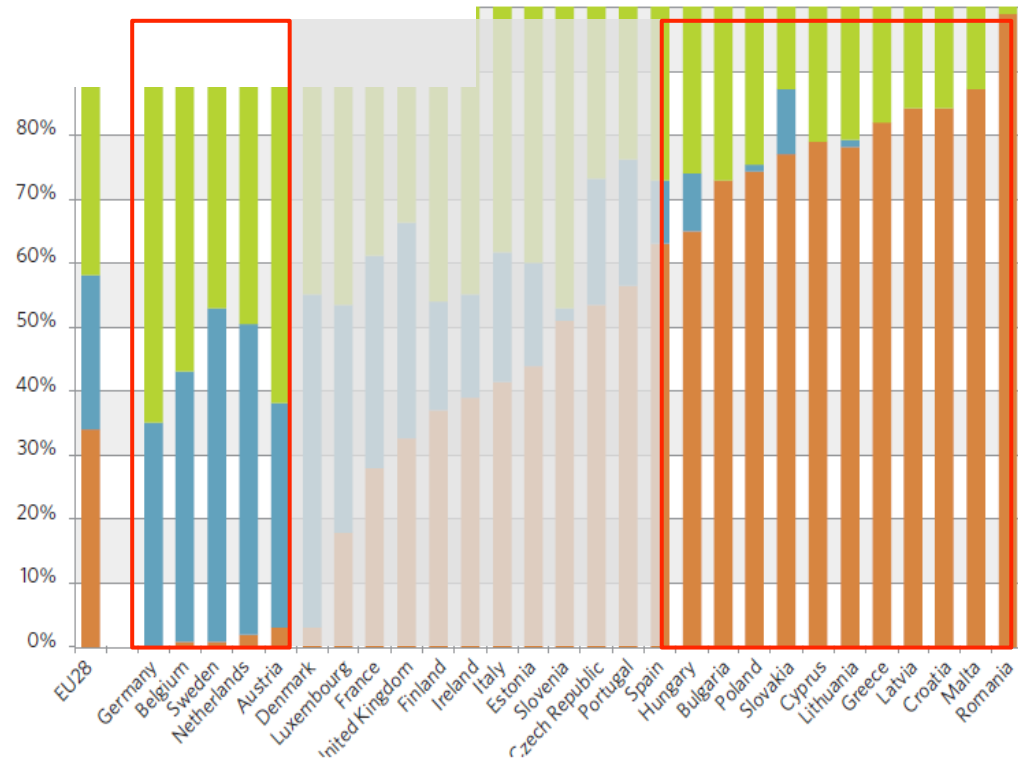
# Energy potential of waste in the EU

**In 2014**

- 272 mil t MSW generated
- 70 mil t recycling
- 40 mil t compost
- 68 mil t incineration
- 94 mil t landfilled

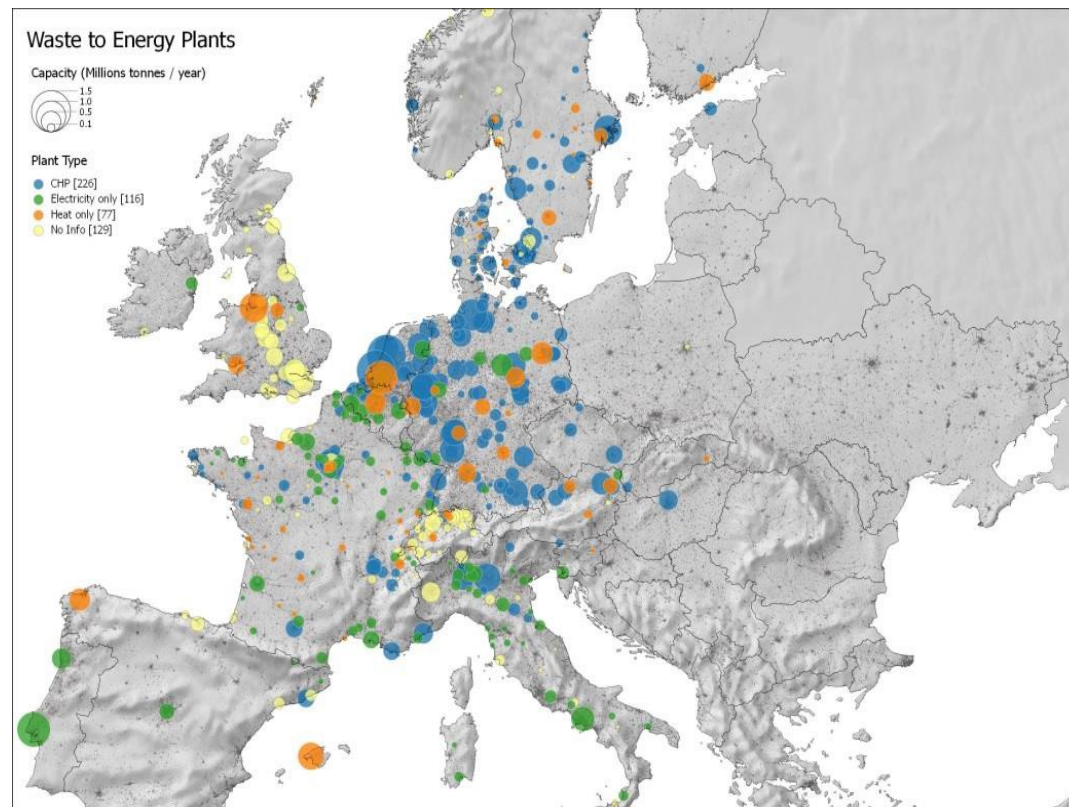
■ Recycled & composted %  
■ Incinerated %  
■ Landfilled %

Most of new MS, have been more focused on landfilling



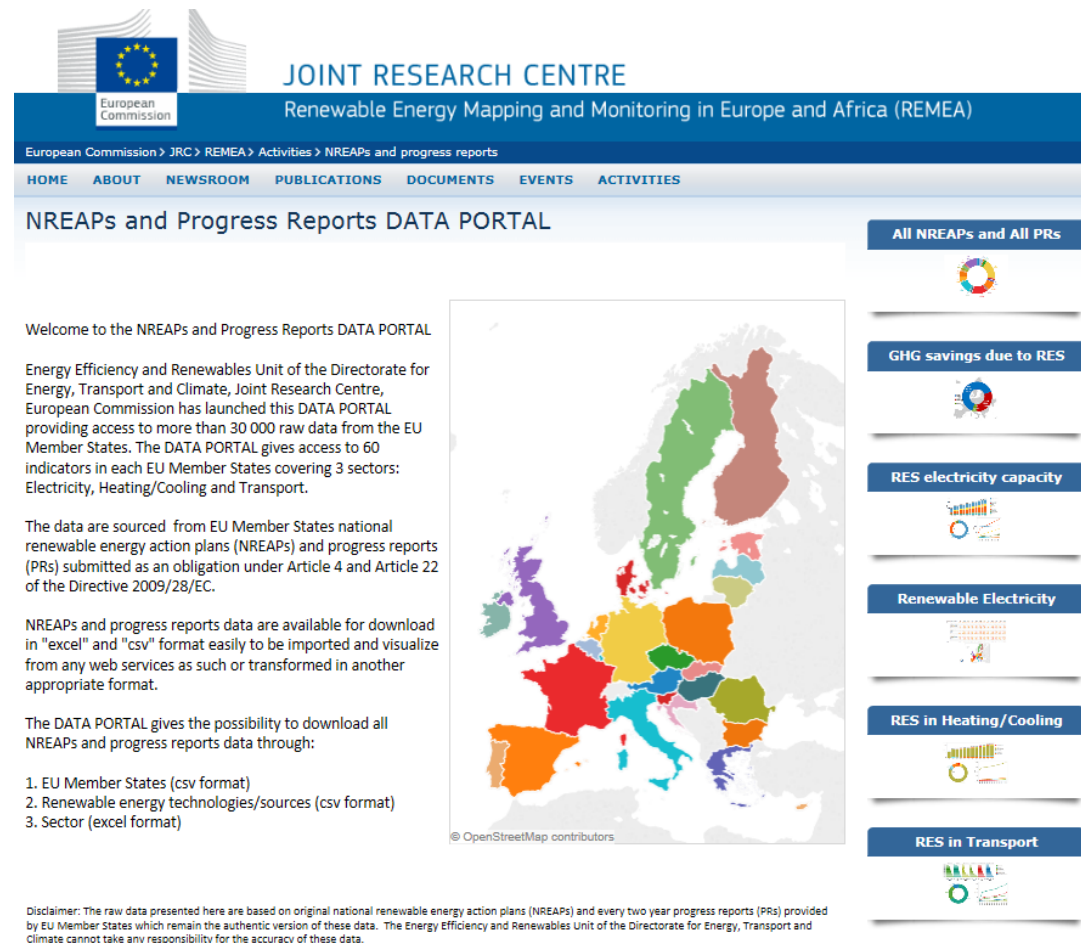
# Energy potential of waste in the EU

- 547 Waste to Energy plants in Europe use Municipal Solid Waste
- 97 mil t MSW capacity of Waste to Energy plants



# NREAPs and Progress Reports Data Portal

Data download (by MS,  
Technology, Sector)



The screenshot shows the website interface for the NREAPs and Progress Reports DATA PORTAL. At the top, it features the European Commission logo and the text 'JOINT RESEARCH CENTRE Renewable Energy Mapping and Monitoring in Europe and Africa (REMEA)'. Below this is a navigation menu with links for HOME, ABOUT, NEWSROOM, PUBLICATIONS, DOCUMENTS, EVENTS, and ACTIVITIES. The main heading is 'NREAPs and Progress Reports DATA PORTAL'. The content area includes a welcome message, a description of the data source (EU Member States' national renewable energy action plans and progress reports), and a list of download options: 1. EU Member States (csv format), 2. Renewable energy technologies/sources (csv format), and 3. Sector (excel format). A map of Europe is displayed on the right side of the content area. On the far right, there is a vertical sidebar with several interactive buttons: 'All NREAPs and All PRs', 'GHG savings due to RES', 'RES electricity capacity', 'Renewable Electricity', 'RES in Heating/Cooling', and 'RES in Transport'. Each button is accompanied by a small icon representing the data it provides.

Welcome to the NREAPs and Progress Reports DATA PORTAL

Energy Efficiency and Renewables Unit of the Directorate for Energy, Transport and Climate, Joint Research Centre, European Commission has launched this DATA PORTAL providing access to more than 30 000 raw data from the EU Member States. The DATA PORTAL gives access to 60 indicators in each EU Member States covering 3 sectors: Electricity, Heating/Cooling and Transport.

The data are sourced from EU Member States national renewable energy action plans (NREAPs) and progress reports (PRs) submitted as an obligation under Article 4 and Article 22 of the Directive 2009/28/EC.

NREAPs and progress reports data are available for download in "excel" and "csv" format easily to be imported and visualize from any web services as such or transformed in another appropriate format.

The DATA PORTAL gives the possibility to download all NREAPs and progress reports data through:

1. EU Member States (csv format)
2. Renewable energy technologies/sources (csv format)
3. Sector (excel format)

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Disclaimer: The raw data presented here are based on original national renewable energy action plans (NREAPs) and every two year progress reports (PRs) provided by EU Member States which remain the authentic version of these data. The Energy Efficiency and Renewables Unit of the Directorate for Energy, Transport and Climate cannot take any responsibility for the accuracy of these data.

[NREAPs and progress reports DATA PORTAL](#)

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