European Commission

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

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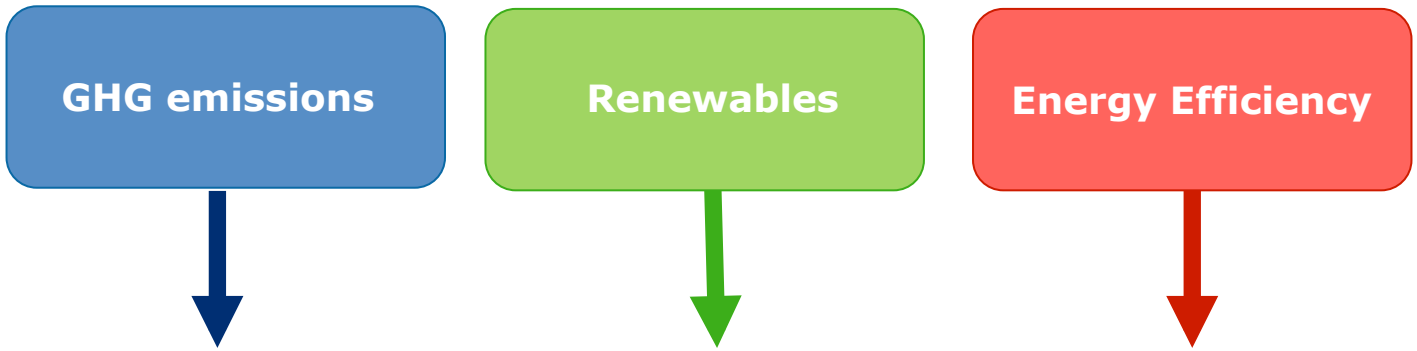
EU Climate and Energy Framework



		GHG emissions	Renewables	Energy Efficiency
2020	TARGETS	-20%	+20%	-20%
2030	TARGETS	-40%	+27%	-27%
	TOOLS	EU-ETS	RED (in revision)	EEDs (in revision)

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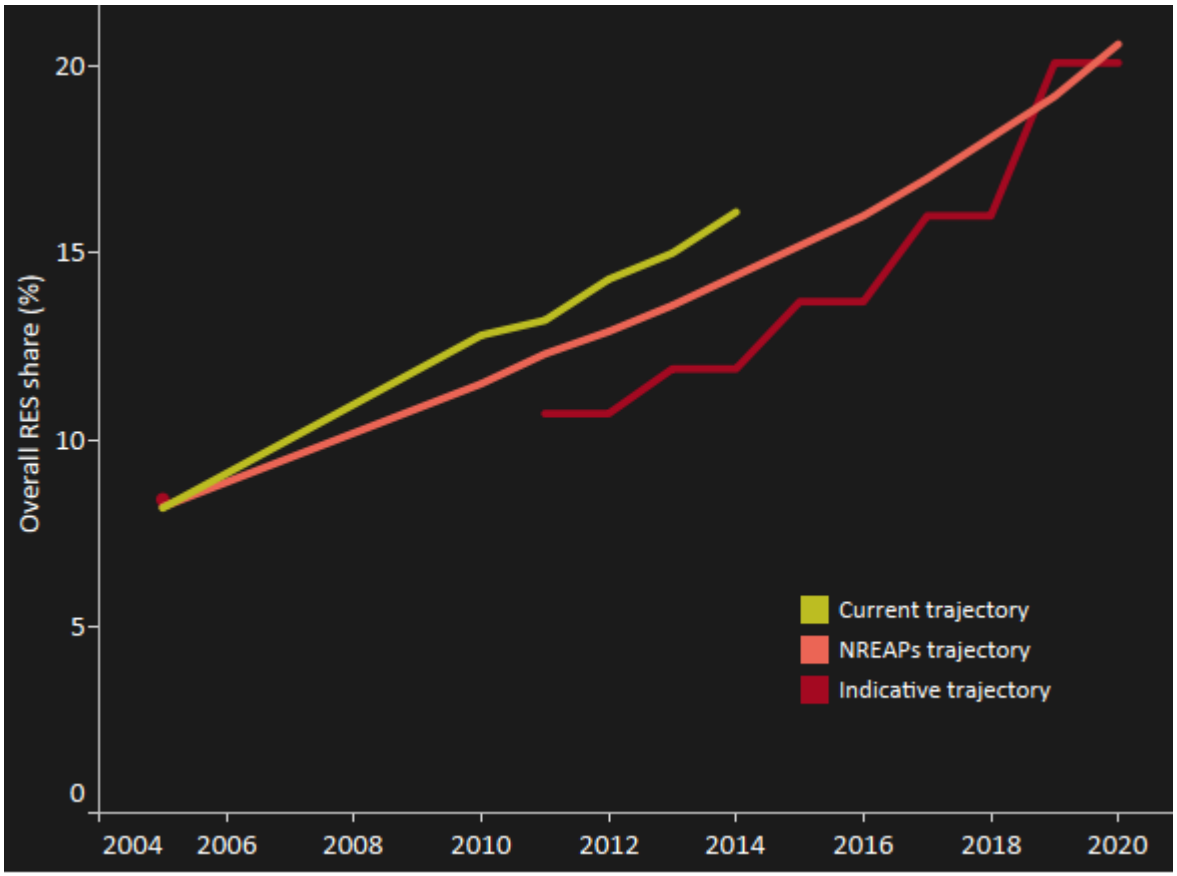
Monitoring progress of renewables in EU

In 2014

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

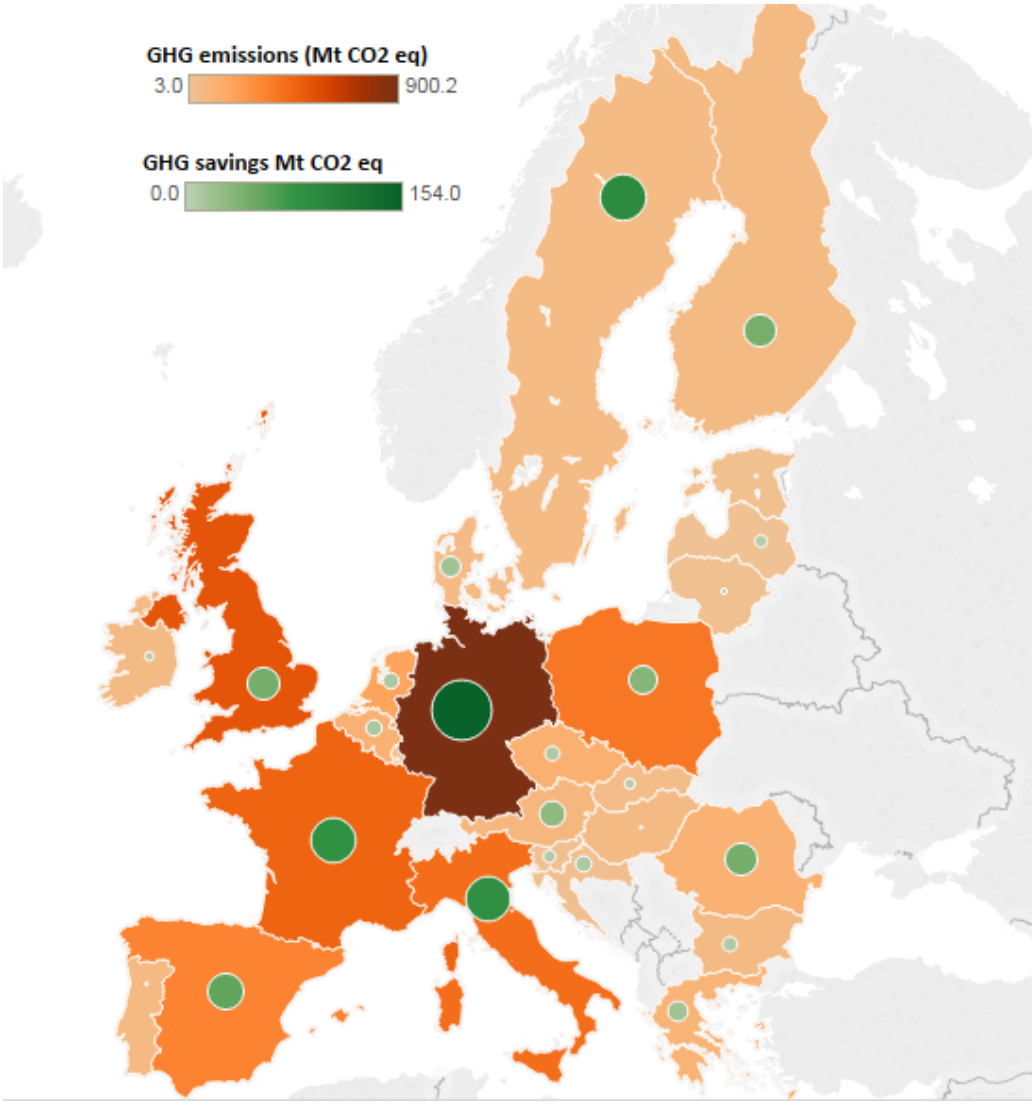
RES-E share **27.4%**
RES-HC share **18.1%**
RES-Tr share **5.6%**

Estimated to reach **16.4%** in 2015



Source: NREAPs and Progress Reports DATA PORTAL

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

Source: NREAPs and Progress Reports DATA PORTAL

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

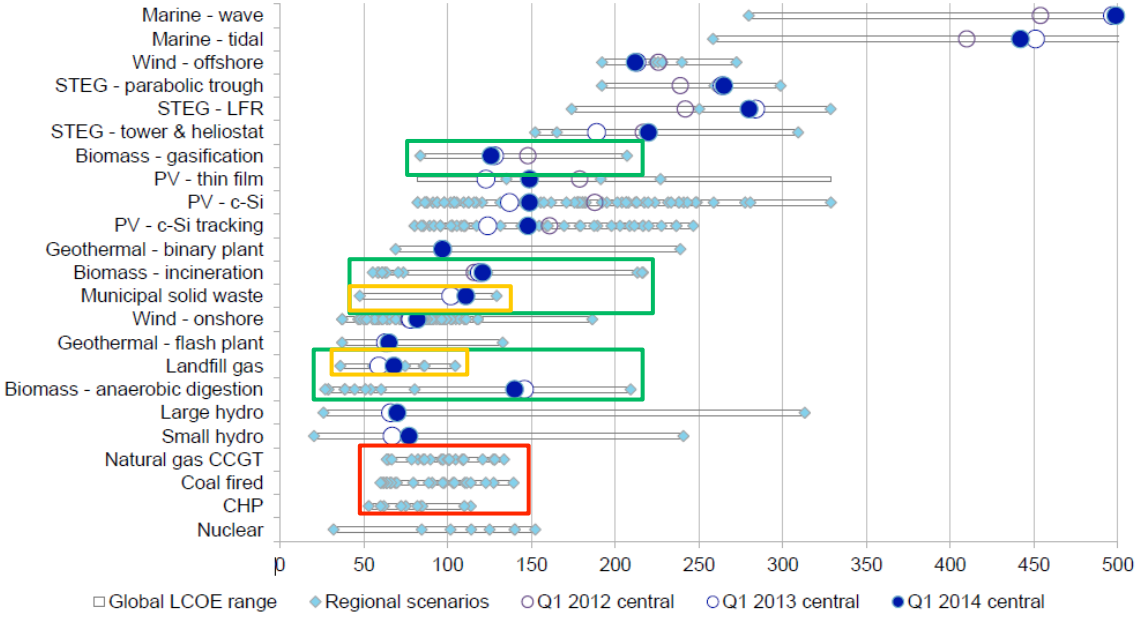
LCOE 27-210 $/MWh

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.

Source: Bloomberg New Energy Finance: H1 2014 Clean Energy Policy & Market Briefing

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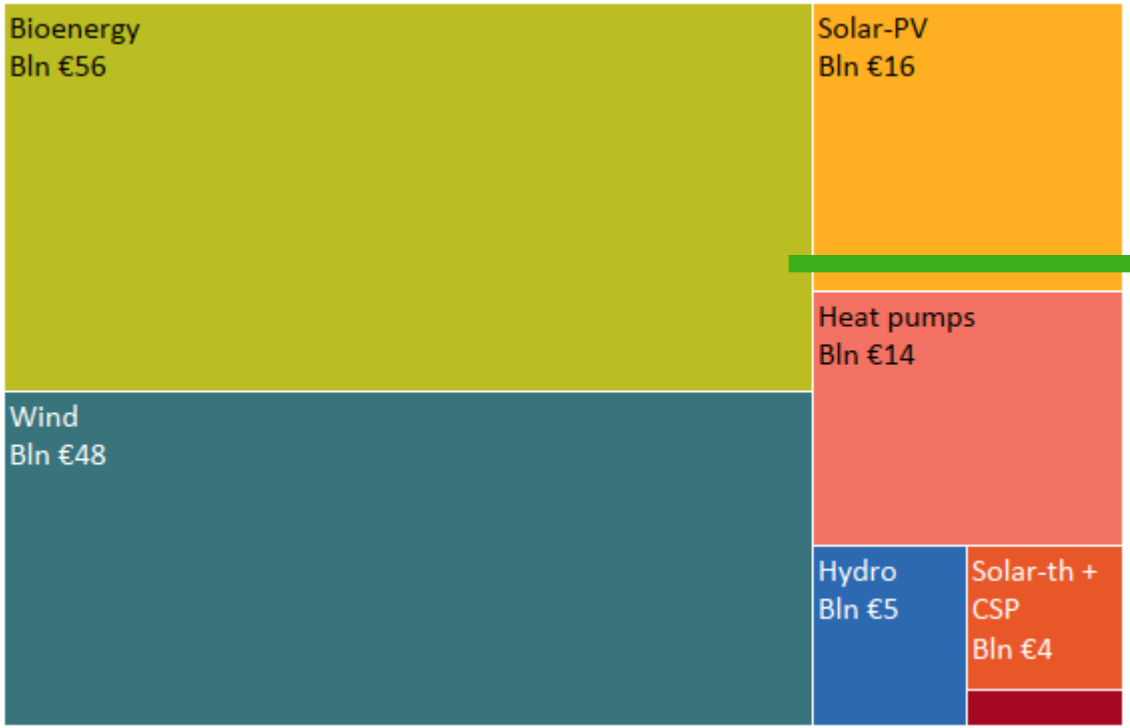
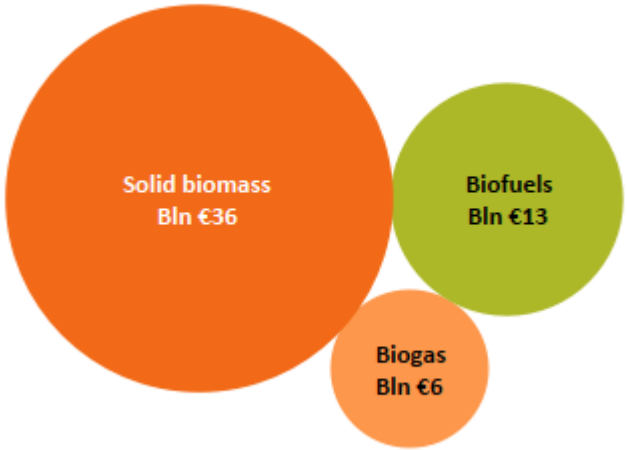
Bioenergy turnover in the EU

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



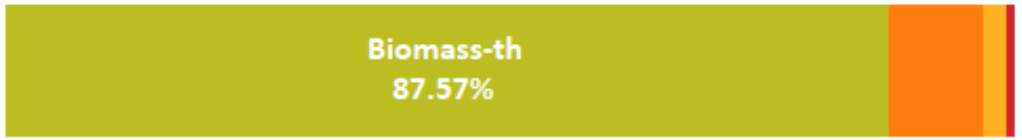


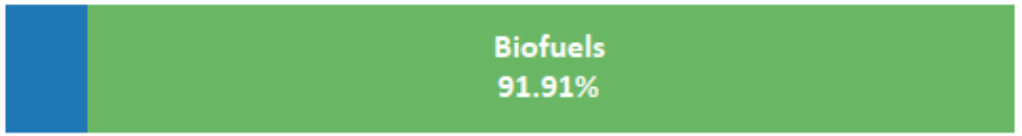
Source: Eurobserv'ER

Bioenergy – leading renewable in the EU

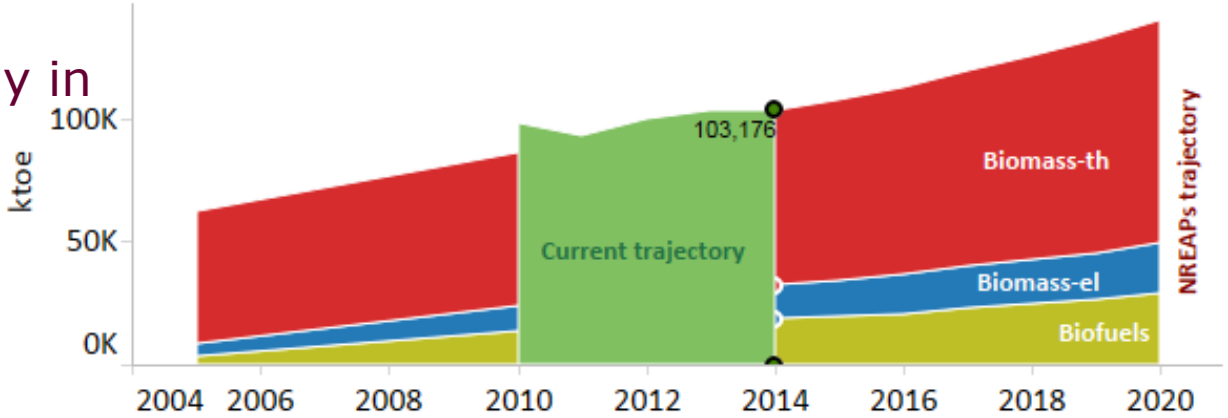
In 2014 **103.2 Mtoe**

~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



Source: NREAPs and Progress Reports DATA PORTAL

Bioenergy – leading renewable in the EU

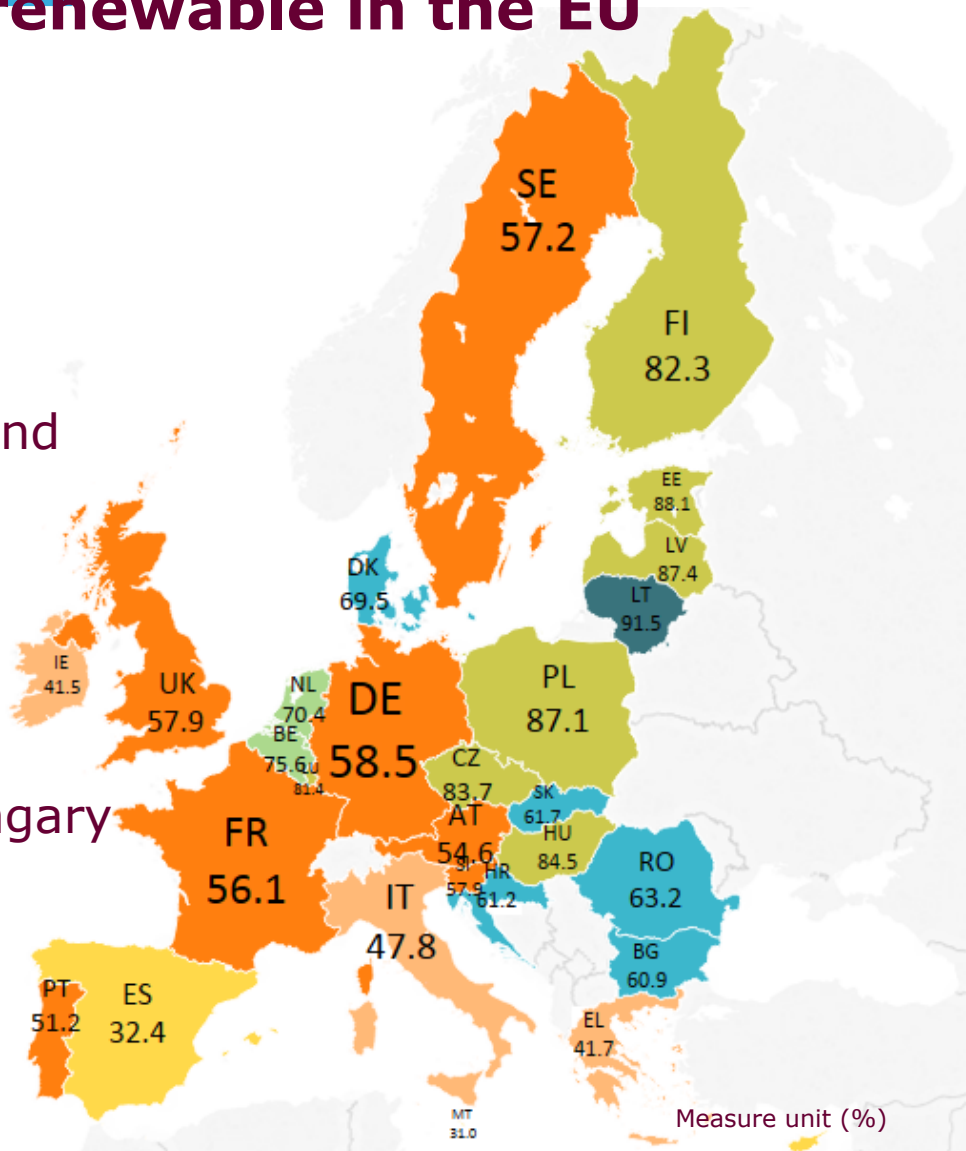
In 2014

Leading countries

Germany, France, Sweden, Italy, Finland

Highest shares in final RES mix

Lithuania, Latvia, Estonia, Poland, Hungary



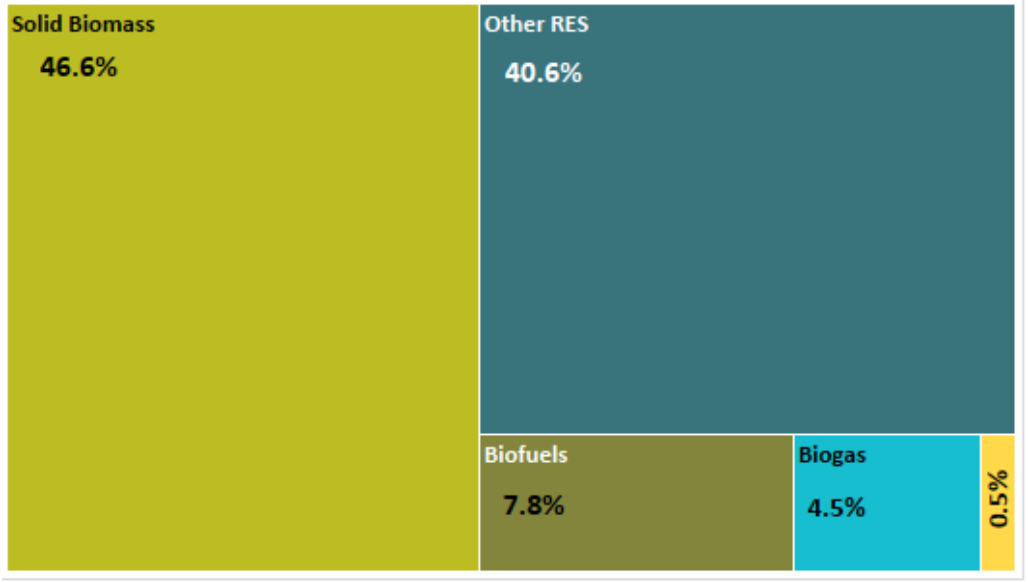
Source: NREAPs and Progress Reports DATA PORTAL

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



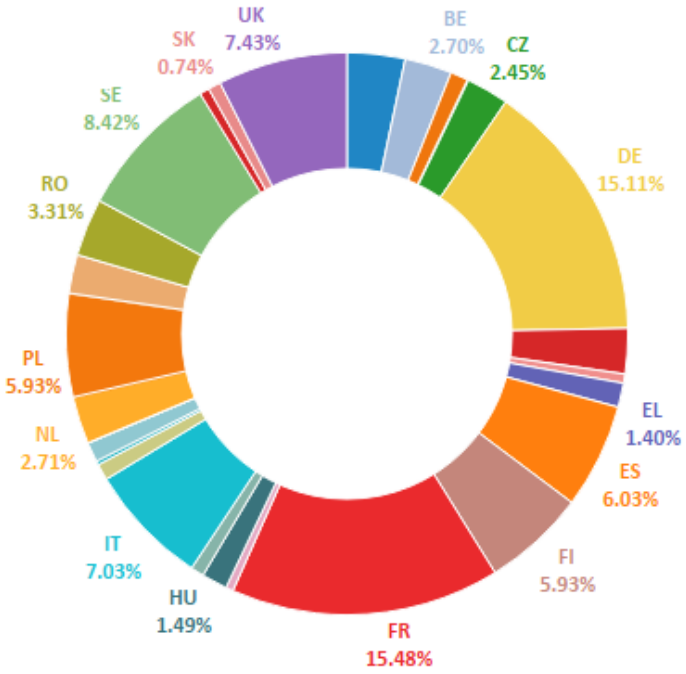
~ 47% of RES was solid biomass
>95% of bioheat was solid biomass
>60% of bioelectricity was solid biomass

Source: NREAPs and Progress Reports DATA PORTAL

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

Source: NREAPs and Progress Reports DATA PORTAL

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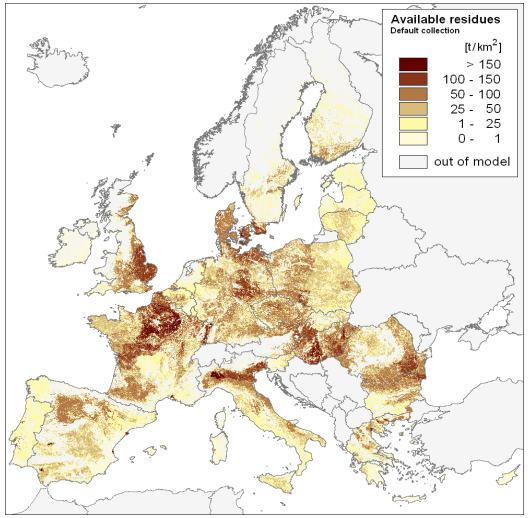
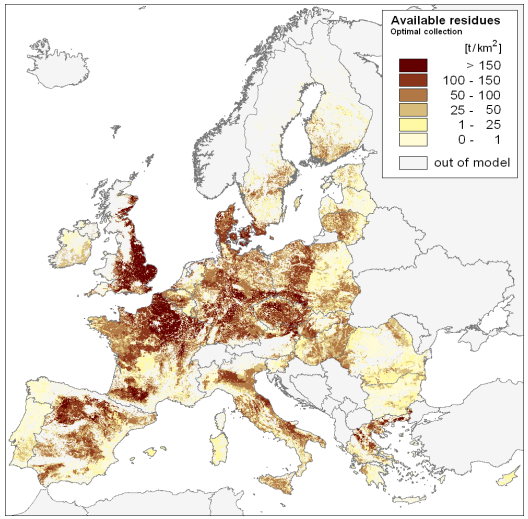
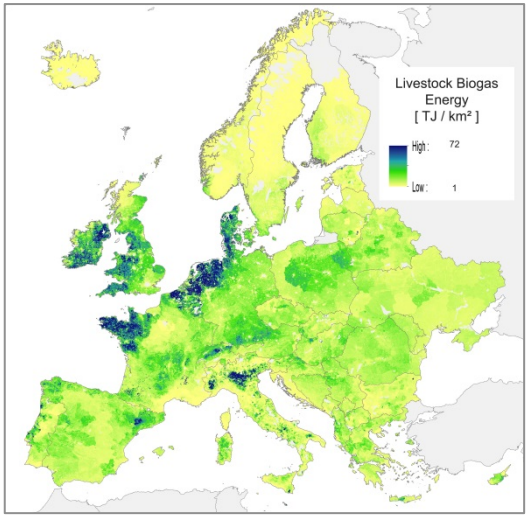
Bioenergy – Resource Mapping

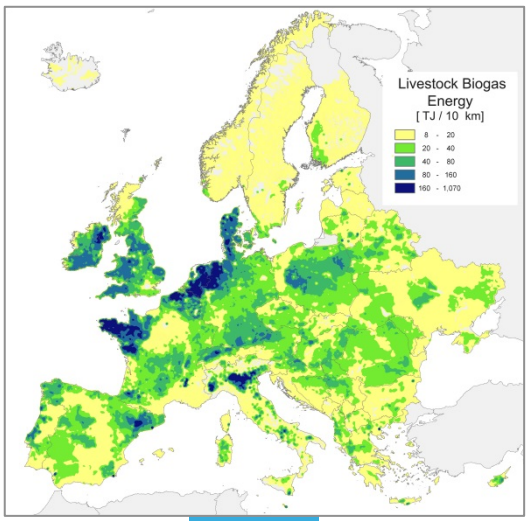
Crop residue production
using default collection and SOC modelling



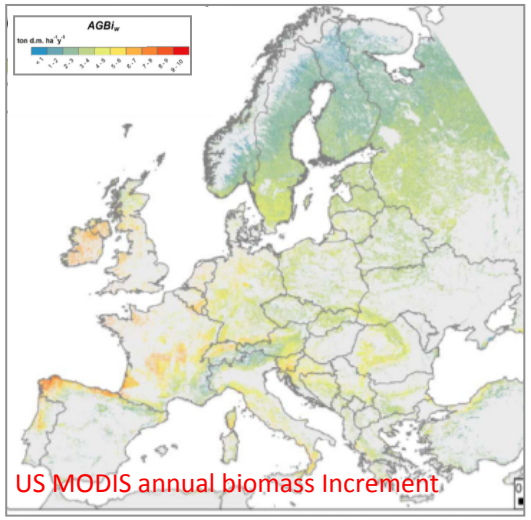


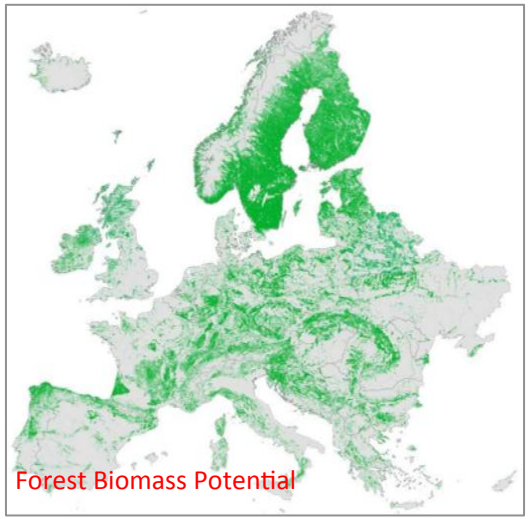
Biogas production
using FAO spatial livestock distribution





Forest biomass potential
statistic data, remote sensing & modelling

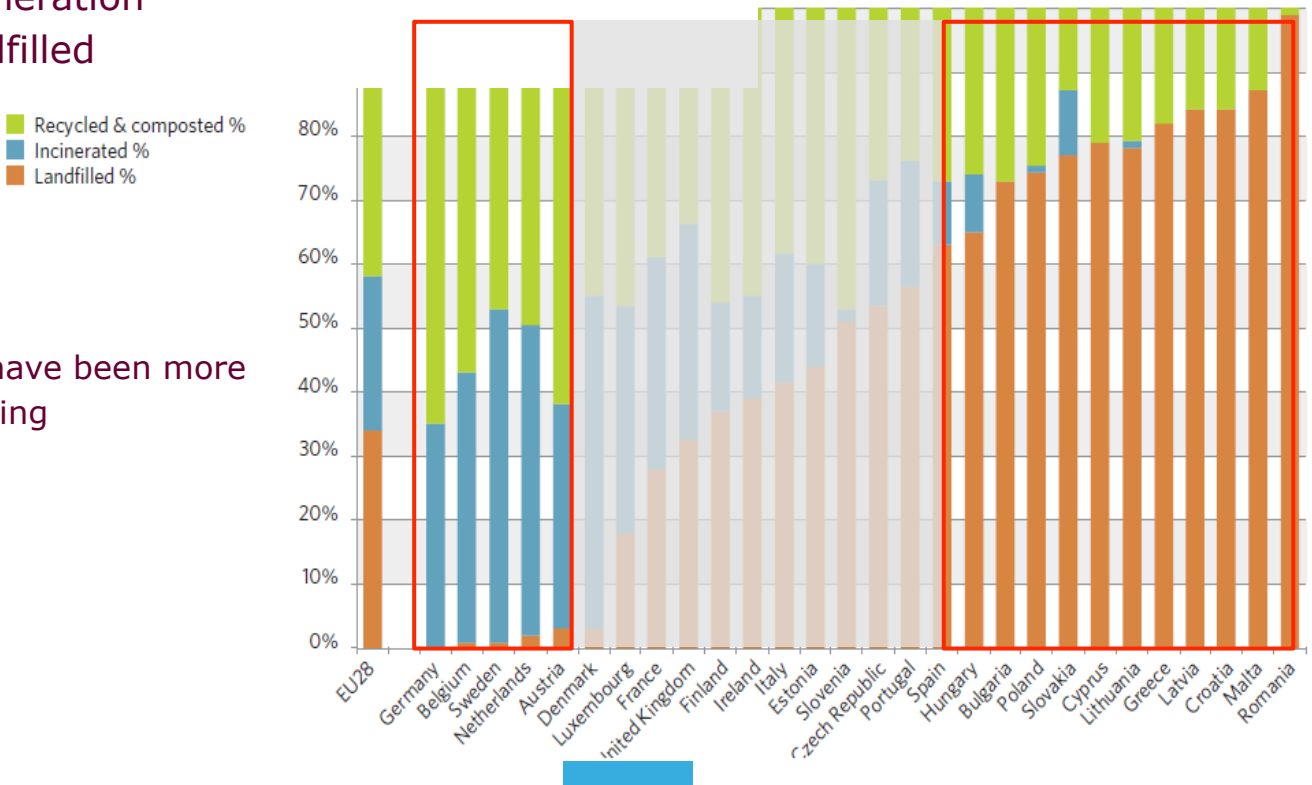




Energy potential of waste in the EU

In 2014

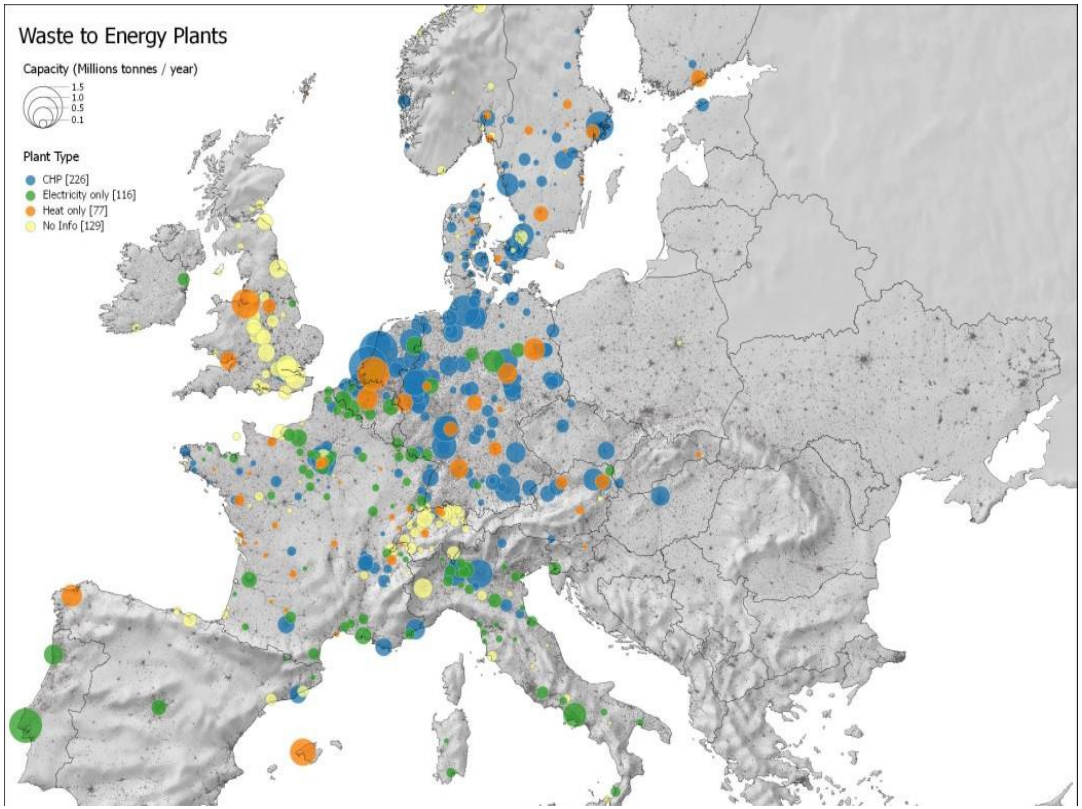
- 272 mil t MSW generated
- 70 mil t recycling
- 40 mil t compost
- 68 mil t incineration
- 94 mil t landfilled



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



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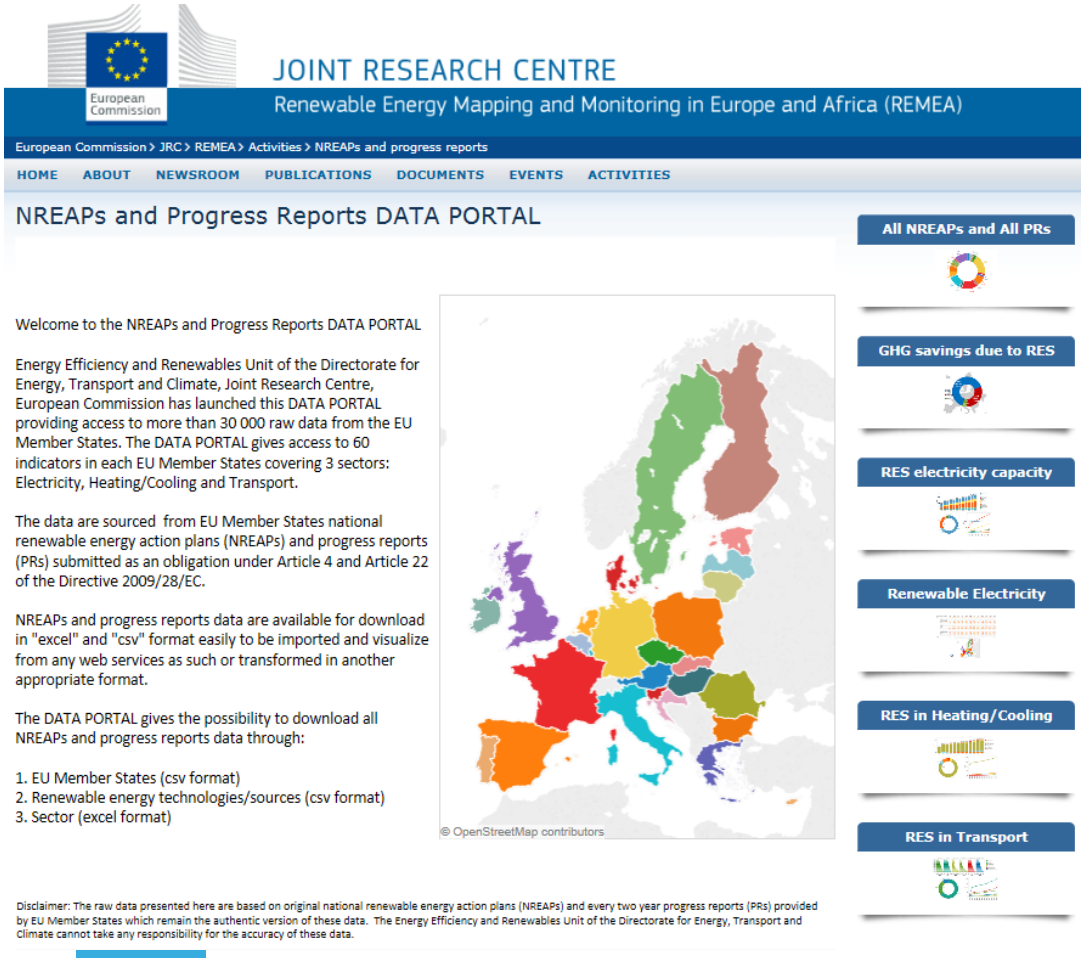
NREAPs and Progress Reports Data Portal

Data download (by MS, Technology, Sector)

[NREAPs and progress reports DATA PORTAL]



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