



THE ROLE OF FORESTS IN RENEWABLE ENERGY POLICY

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REKK Workshop

Forest biomass for decarbonisation -

***The trade-off between forest wood for biomass energy and as an instrument for
carbon sequestration***

20 April 2023, 10:00 – 12:00

Online

Outline

- A global perspective on the climate change
 - Paris Agreement: National Determined Contributions
 - International Panel of Climate Change (IPCC): National inventory reports
 - International Energy Agency (IEA):
 - Net Zero Scenarios
 - Energy Balances methodology
 - European Union (EU): Climate neutrality by 2050
 - Bioenergy and forestry in Energy Balances and energy modelling

The UN, the Paris Agreement & IPPC

- Climate change is a global emergency that goes beyond national borders and requires international cooperation and coordinated solutions at all levels ->
- > UN Climate Change Conference (COP21) Paris Agreement (2015) ->
- > long-term goals to guide all nations:
 - substantially reduce global GHG emissions to limit the global temperature increase in this century to 2°C while pursuing efforts to limit the increase even further to **1.5 °C**;
 - review countries' commitments every 5 years (National Determined Contributions)
 - provide financing to developing countries to mitigate climate change, strengthen resilience and enhance abilities to adapt to climate impacts.

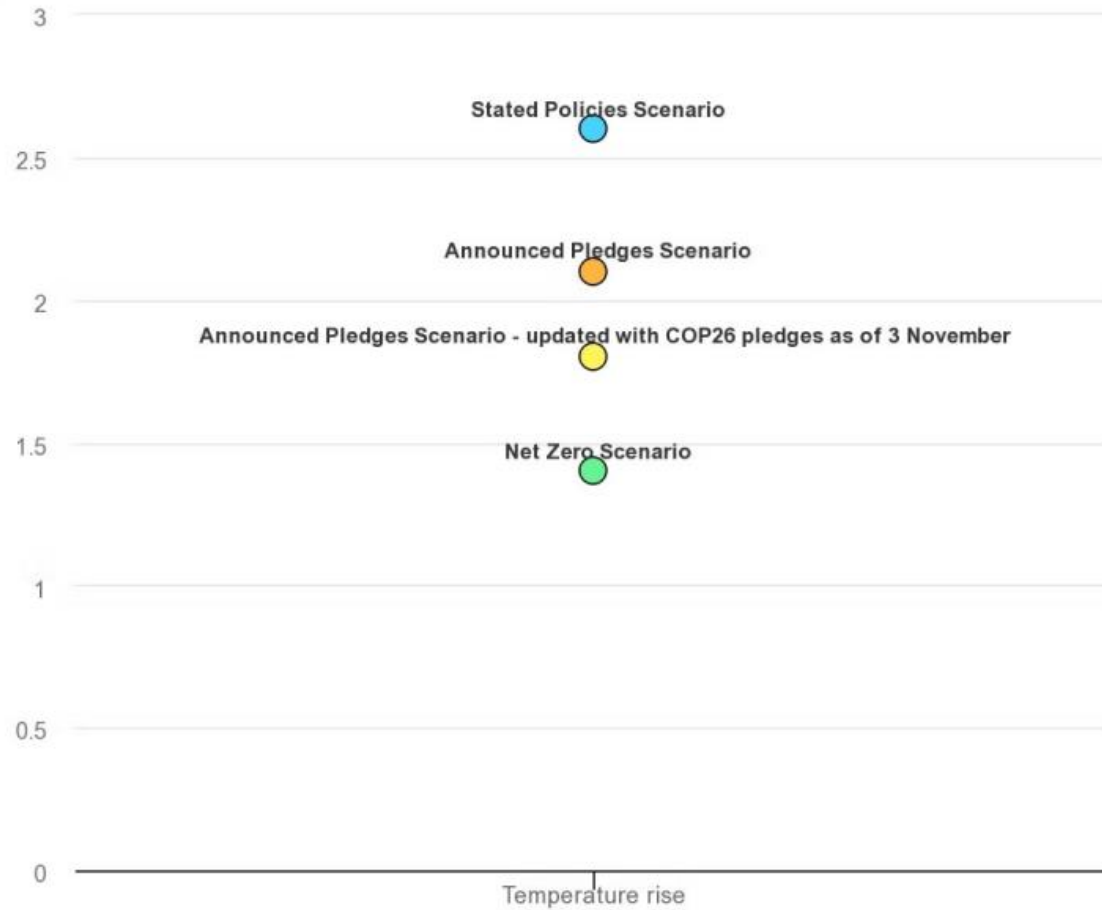
Paris Agreement & IPCC

- The Intergovernmental Panel on Climate Change (IPCC) is the UN body for assessing the science related to climate change with a uniform methodology of reporting the progress.
- IPCC considers bioenergy as carbon neutral and defines:
 - **Bioenergy** as Energy derived from any form of biomass, and **Biomass** as:
 - (1) The total mass of living organisms in a given area or of a given species usually expressed as dry weight. Includes above and below ground living biomass.
 - (2) Organic matter consisting of or recently derived from living organisms (especially regarded as fuel) excluding peat. Includes products, by-products and waste derived from such material
 - **Biofuels**: Any fuels derived from biomass, either deliberately grown or from waste products. Peat is not considered a biofuel in these guidelines due to the length of time required for peat to re-accumulate after harvest.

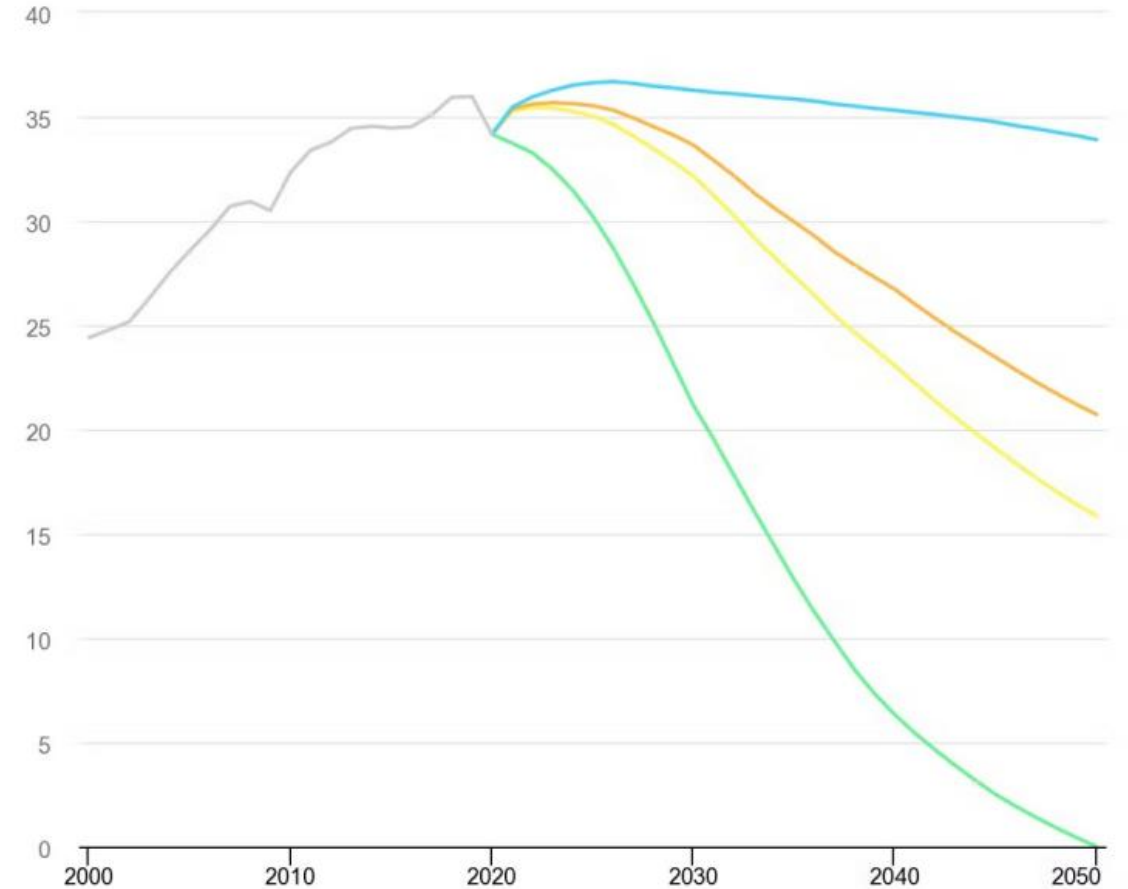
IPCC & International Energy Agency (IEA)

- Globally, about 80% of GHG emissions are attributed to the fossil fuel combustion
 - much efforts in climate change mitigation are assigned to reduction of fossil fuel use: reduced consumption of energy (energy efficiency, behavioural changes, passive energy, integrated energy systems...) and use energy from non-fossil sources (renewables, nuclear, passive energy)
 - Access to food, economic development and life quality/comfort greatly depend on energy supply.
- As energy sector is a major GHG emission source, IPCC methodology greatly relies on the data from national energy balances.
- IEA provides an uniform methodology for energy balances.
- In Energy balances, combustion of fossil fuels (thus, GHG emissions) is recorded by a source, not by the economic activity.

Energy modelling – global scenarios



Temperature rise



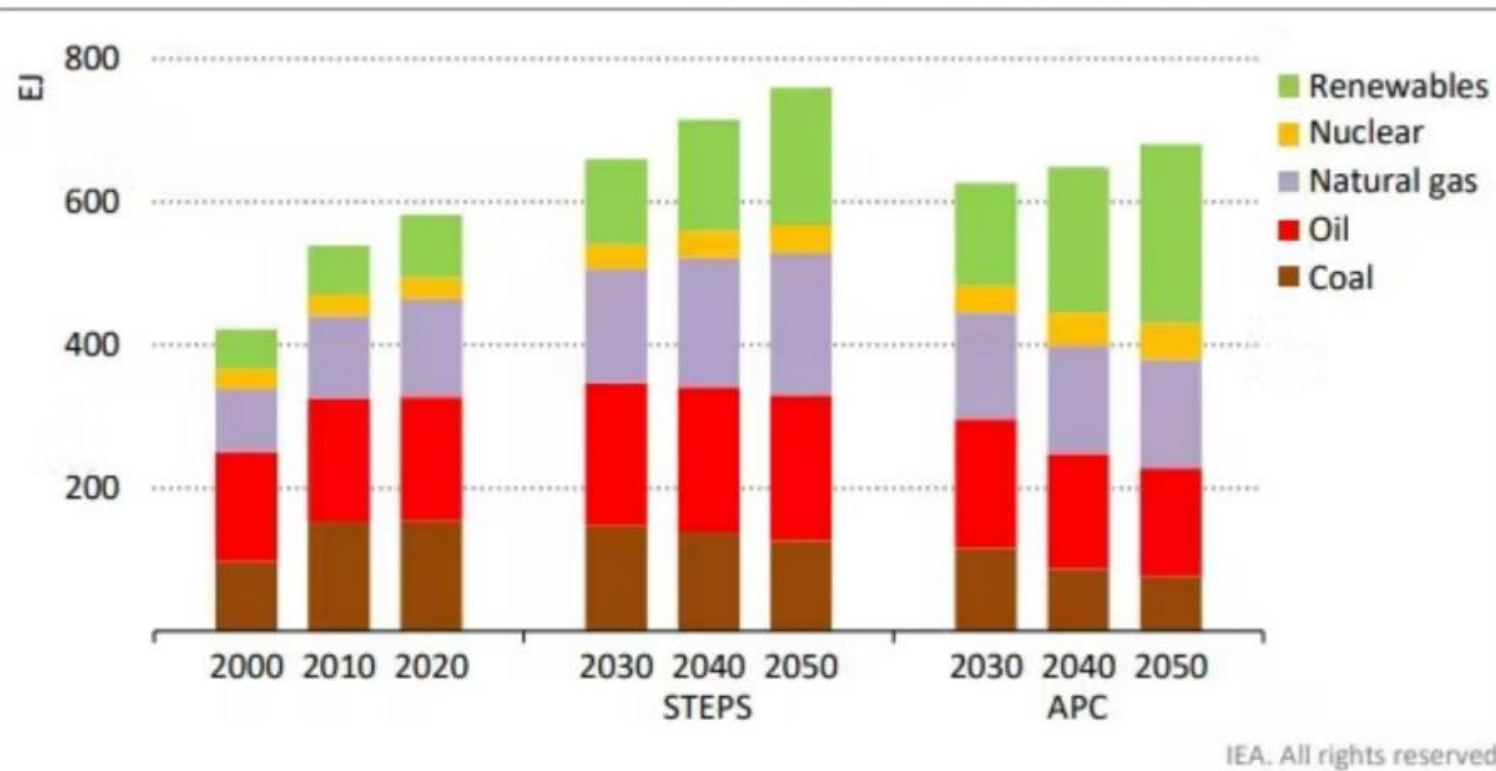
GHG emissions by 2050

IEA (2021), World Energy Model, IEA, Paris
<https://www.iea.org/reports/world-energy-model>



STEPS (Stated Policy Scenario) = +2.6 °C
 APC (Announced Pledges) = +2.1 °C
 Net zero = +<1.5 °C

Figure 1.12 ▶ Total energy supply by source in STEPS and APC



Announced net zero pledges lift renewables in the APC from 12% of total energy supply in 2020 to 35% in 2050, mainly at the expense of coal and oil

IEA (2021), *Net Zero by 2050*, IEA, Paris
<https://www.iea.org/reports/net-zero-by-2050>,
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The role of bioenergy in the Announced Pledges Contributions

The global increase in energy supply in the APC is led by renewables, which increase their share in the energy mix from 12% in 2020 to 35% by 2050 (compared with 25% in 2050 in the STEPS).

Solar photovoltaics (PV) and wind in the electricity sector together contribute about 50% of the growth in renewables supply, and

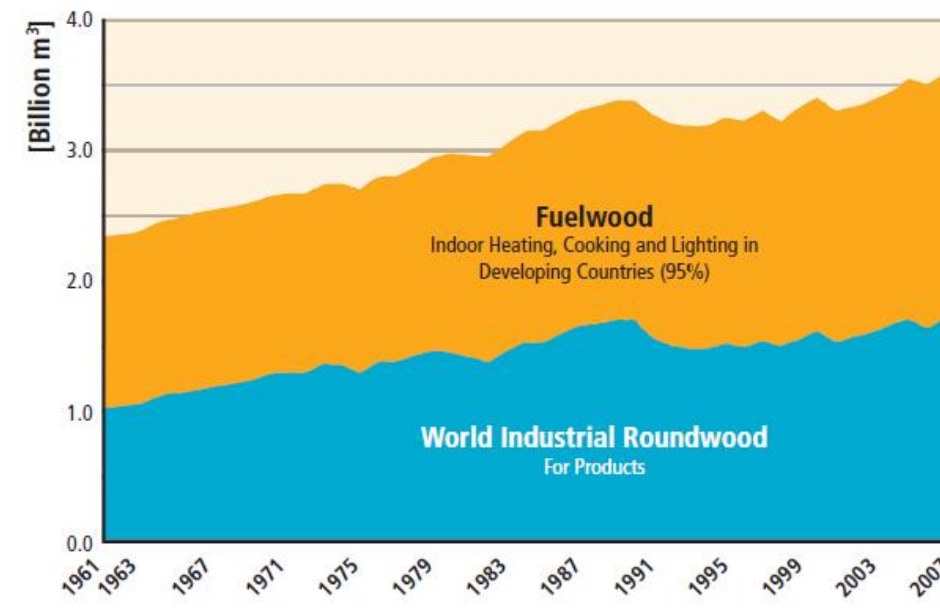
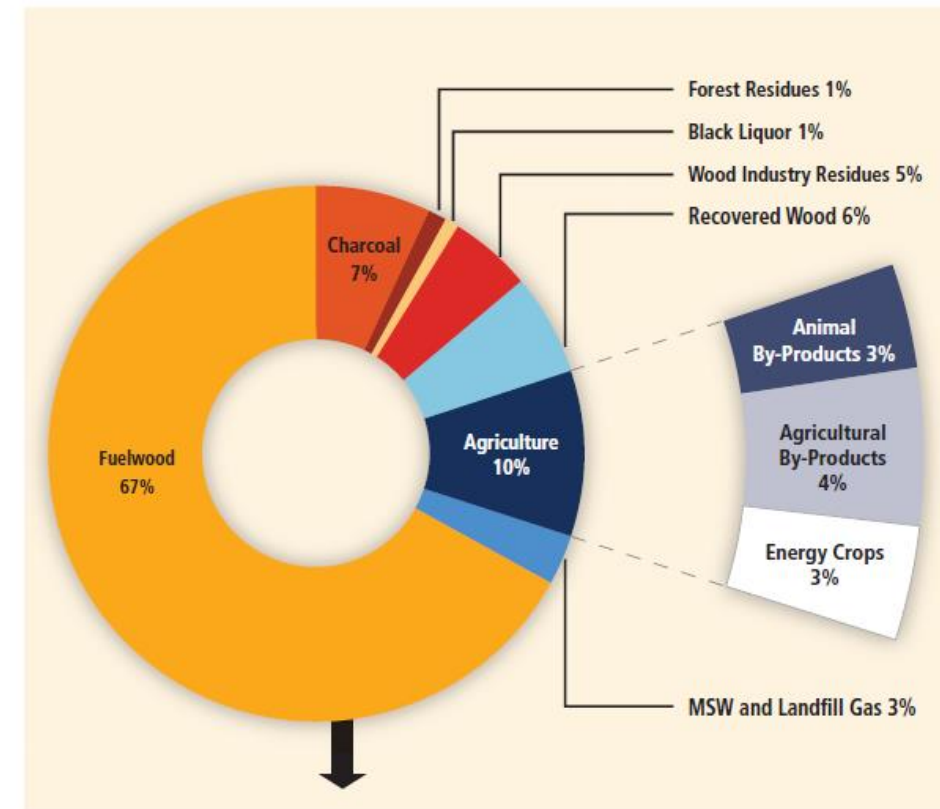
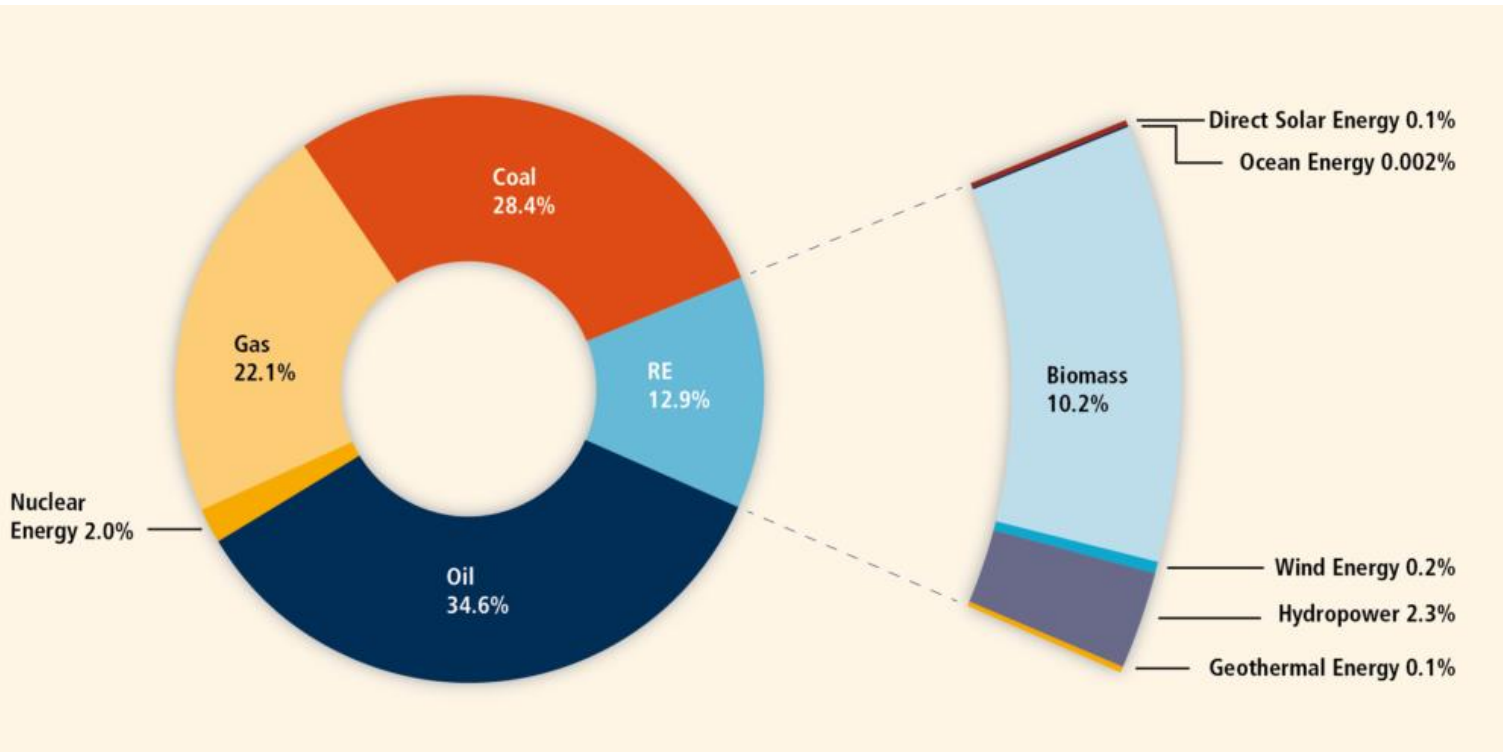
bioenergy contributes around 30%.

Bioenergy use doubles in industry, triples in electricity generation and grows by a factor of four in transport: it plays an important role in reducing emissions from heat supply and removing CO₂ from the atmosphere when it is combined with CCUS.

Nuclear maintains its share ...

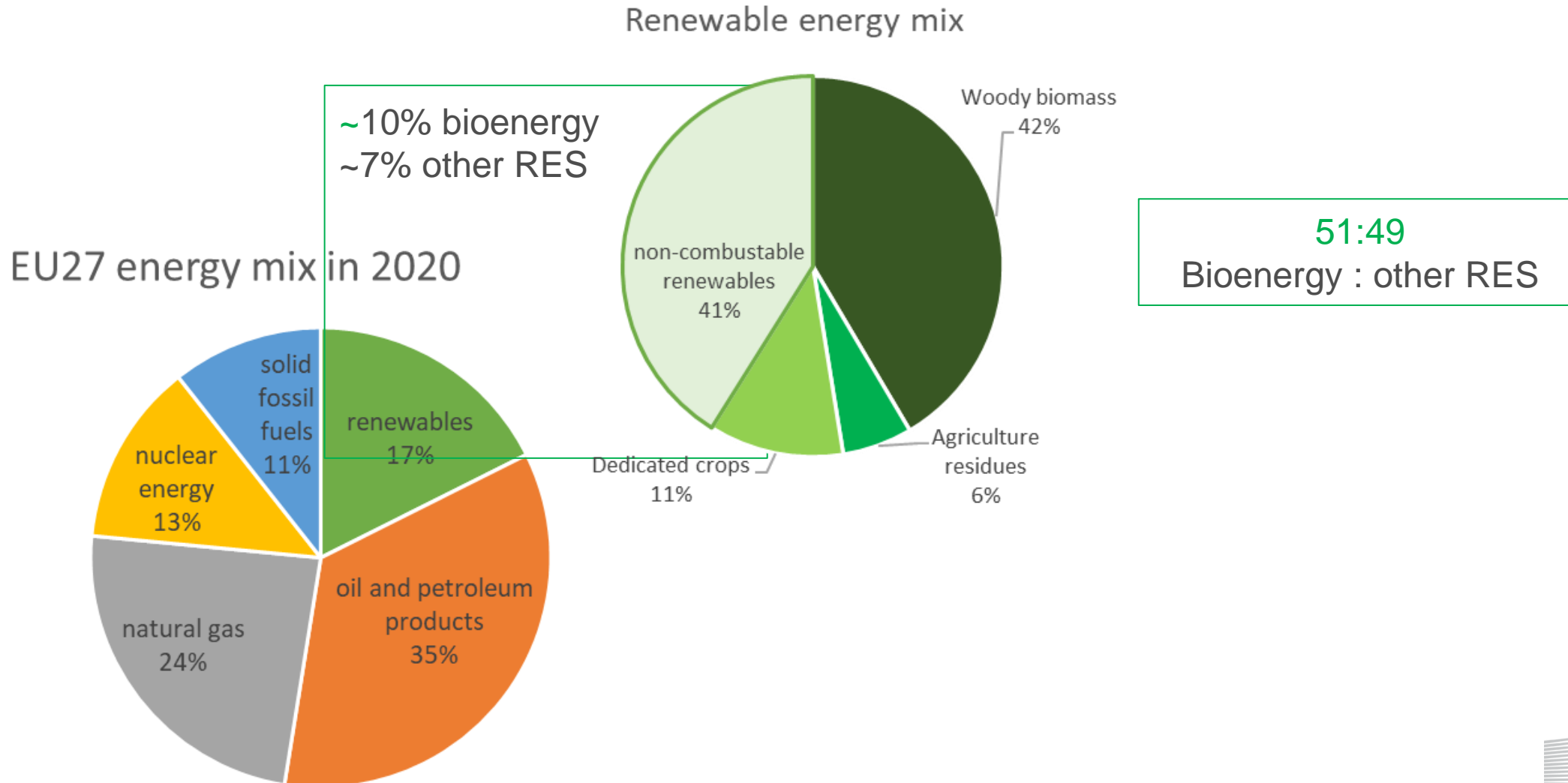
IEA (2021), *Net Zero by 2050*, IEA, Paris
<https://www.iea.org/reports/net-zero-by-2050>, License: CC BY 4.0

Bioenergy at the global level



- IPCC, 2011 – Ottmar Edenhofer, Ramón Pichs-Madruga, Youba Sokona, Kristin Seyboth, Patrick Matschoss, Susanne Kadner, Timm Zwickel, Patrick Eickemeier, Gerrit Hansen, Steffen Schloemer, Christoph von Stechow (Eds.)
 Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1075 pp. Available from [Cambridge University Press](http://www.cambridge.org/9780521146513), The Edinburgh Building Shaftesbury Road, Cambridge CB2 2RU ENGLAND

Bioenergy at the EU27 level (Eurostat, own calculations)



Primary solid biofuels in Energy statistics

- “solid biofuels is a product aggregate equal to the sum of charcoal, fuelwood, wood residues and by-products, black liquor, bagasse, animal waste, other vegetal materials and residuals and renewable fraction of industrial waste”
- In the EU27, dominantly **woody biomass** that has not been distinguished by source
- Statistical code R5110-5150_W6000RI

≠ **Primary woody biomass (UNECE)**: All roundwood felled or otherwise harvested and removed. It comprises all wood obtained from removals, i.e., the quantities removed from forests and from trees outside the forest, including wood recovered due to natural mortality and from felling and logging. It includes all wood removed with or without bark, including wood removed in its round form, or split, roughly squared or in other form, e.g., branches, roots, stumps and burls (where these are harvested) and wood that is roughly shaped or pointed.

Energy balances: EU 27

Fuel: **Combustible renewables (biofuels)** | Countries: **European Union (27 countries)** | Years: **2021** | Unit: **Thousand tonnes of oil equivalent** | Decimals: **0**



Energy balances

71% woody biomass

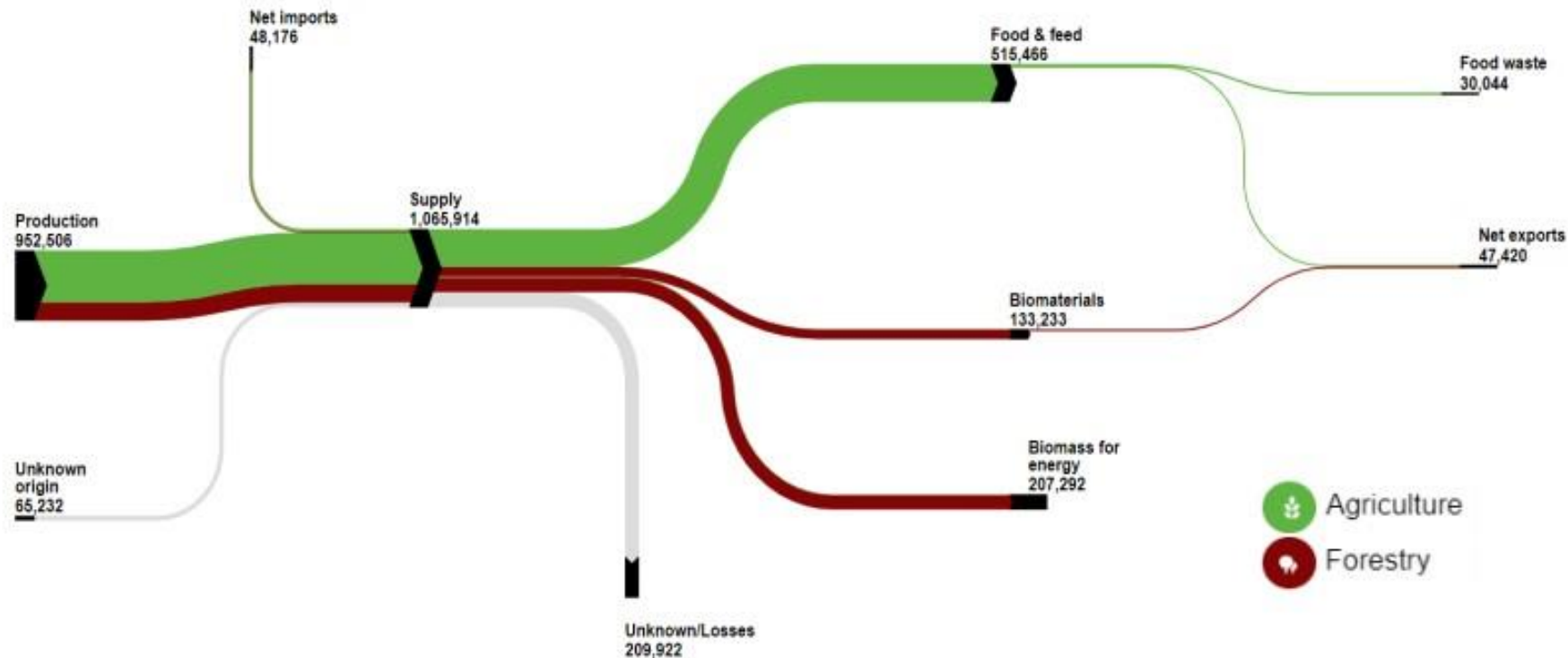
11% mainly agricultural Biogases

Mainly dedicated crops: 18%

Year: 2021 Unit: KTOE	Primary solid biofuels	Charcoal	Biogases	Pure biogasoline	Blended biogasoline	Pure biodiesels	Blended biodiesels	Pure bio jet kerosene	Blended bio jet kerosene	Other liquid biofuels	Renewable municipal waste
Total energy supply	104 134	251	14 948	3 197	-34	14 287	409	0	0	1 198	9 780
Primary production	100 485	0	14 929	2 418	0	12 846	0	0	92	605	9 299
Recovered and recycled products	0	0	0	0	0	0	0	0	0	0	0
Imports	9 039	299	19	1 796	163	9 132	893	0	0	593	503
Exports	5 609	50	0	1 027	205	8 028	471	0	92	0	24
Change in stock	218	3	0	11	7	337	152	0	0	0	2
Gross available energy	104 134	251	14 948	3 197	-34	14 287	575	0	0	1 198	9 780
International											

Biomass supply EU27: ~30:70 forests : agriculture

Figure 1. Biomass flows by sector, EU-27, net trade, 2017 (1000 tdm).



Note: Data for 2017 is shown for cross-sectoral comparison. The width of the flows is proportional to the quantity of biomass of each origin and the flows may not be visible in the figures (e.g. agriculture to bioenergy). Please refer to the online version (https://datam.jrc.ec.europa.eu/datam/mashup/BIOMASS_FLOWS/).

Primary solid biofuels origin – not visible in Energy balances

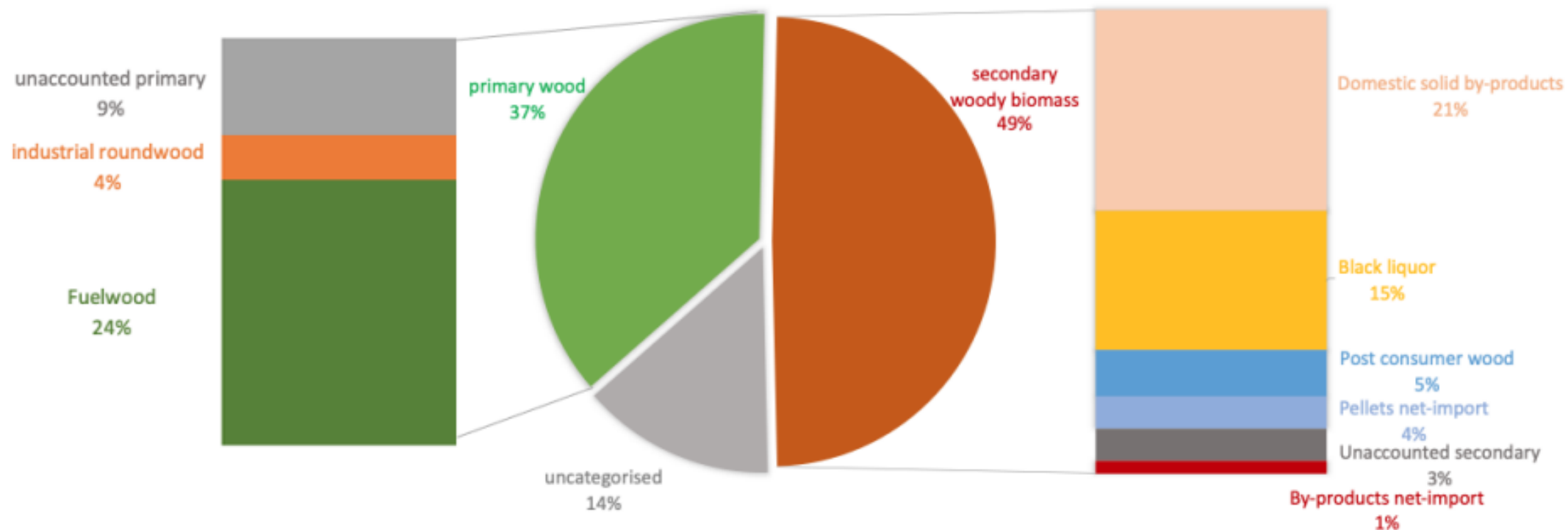


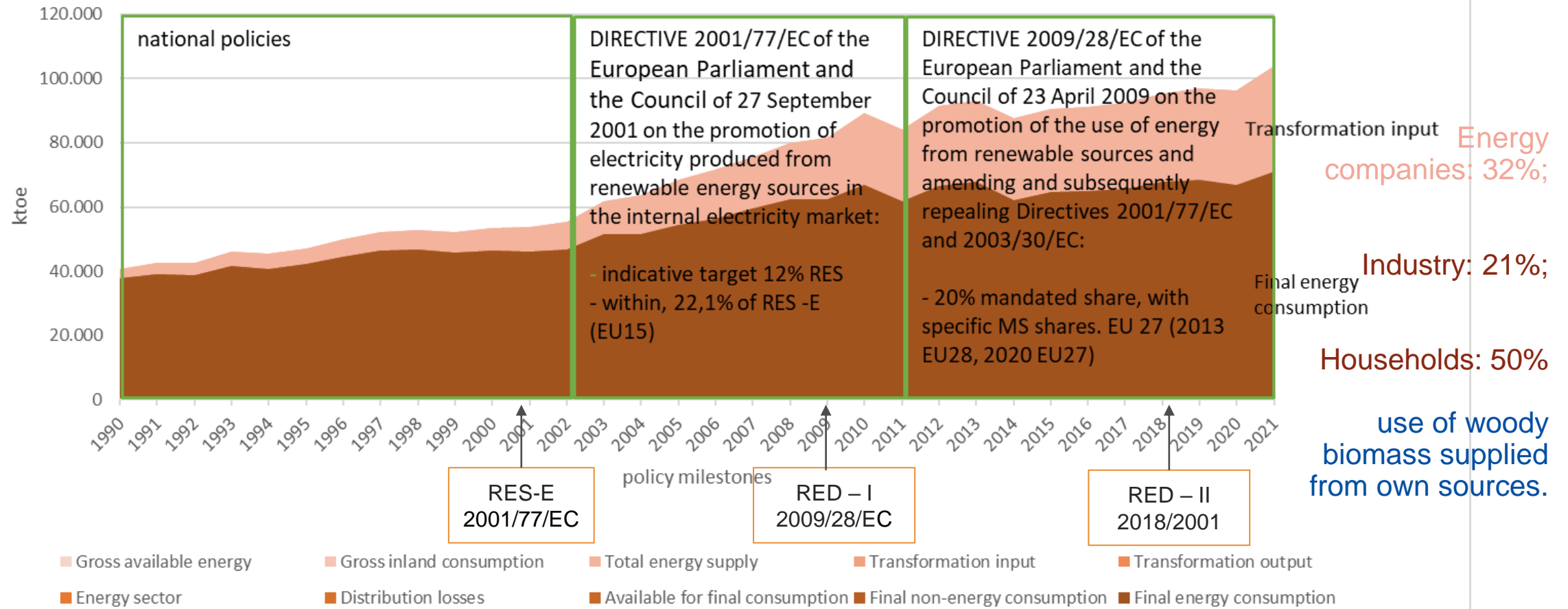
Figure 8. Origin of wood fibres used for bioenergy in the EU (2015)

Source: JRC (2021): The use of woody biomass for energy production in the EU

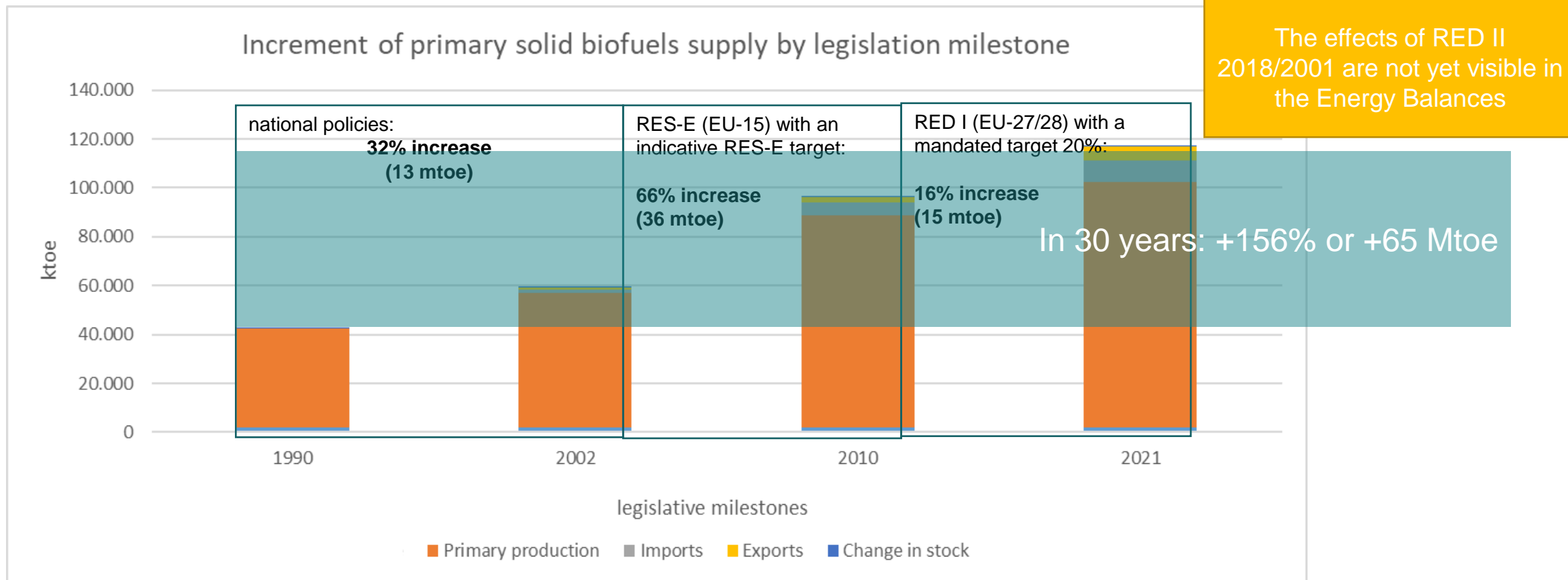
Where primary solid biofuels are consumed?

The effects of RED II 2018/2001 are not yet visible in the Energy Balances

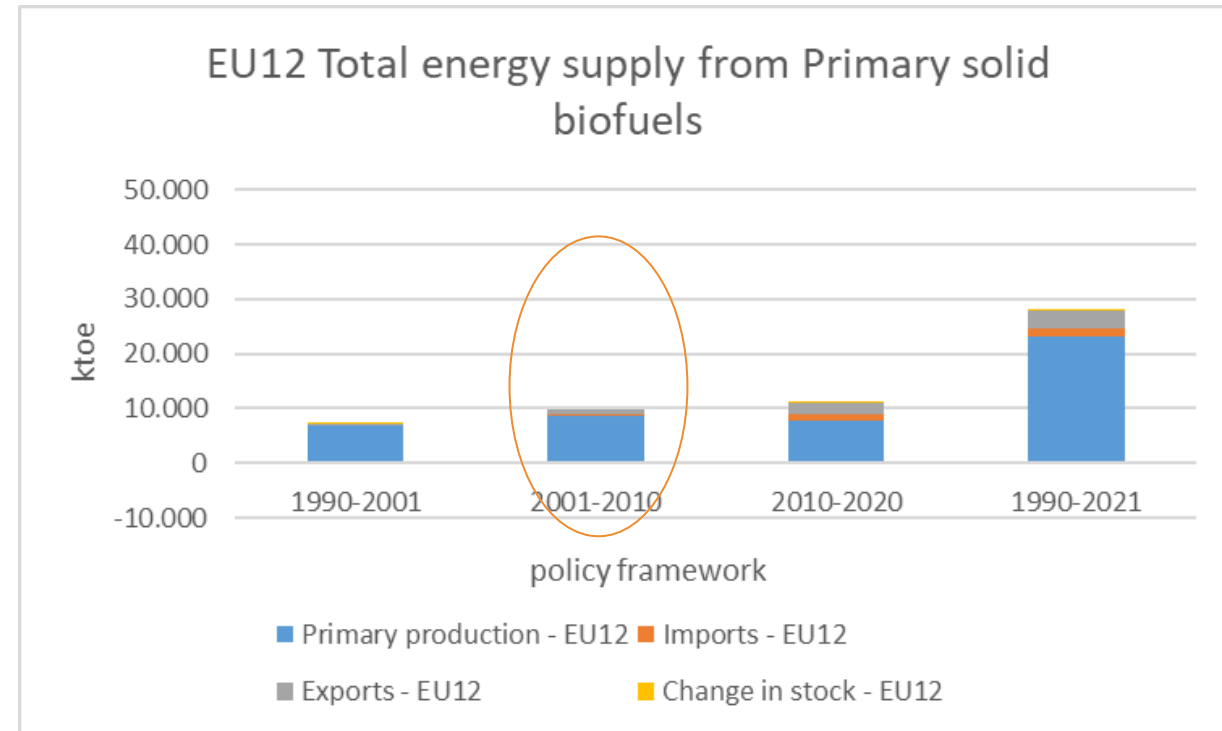
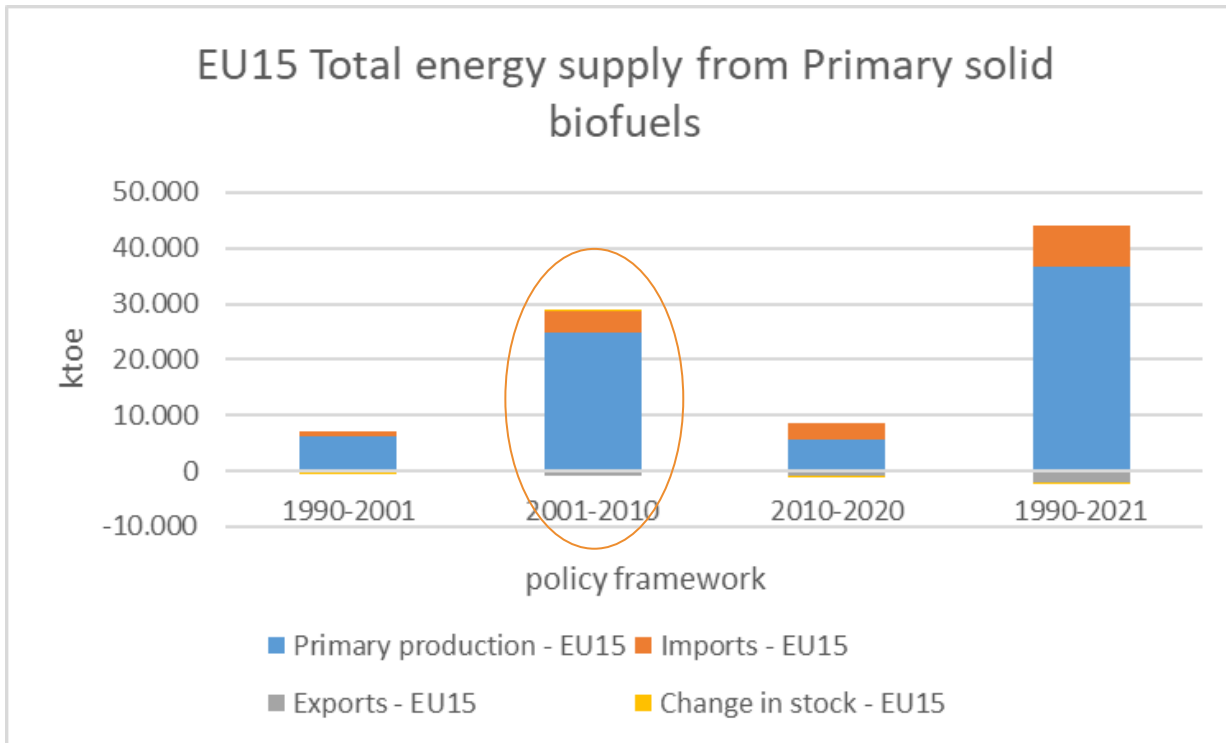
Primary solid biofuels - main categories Energy Balances



What was the increase in primary solid biofuels demand over a policy framework?



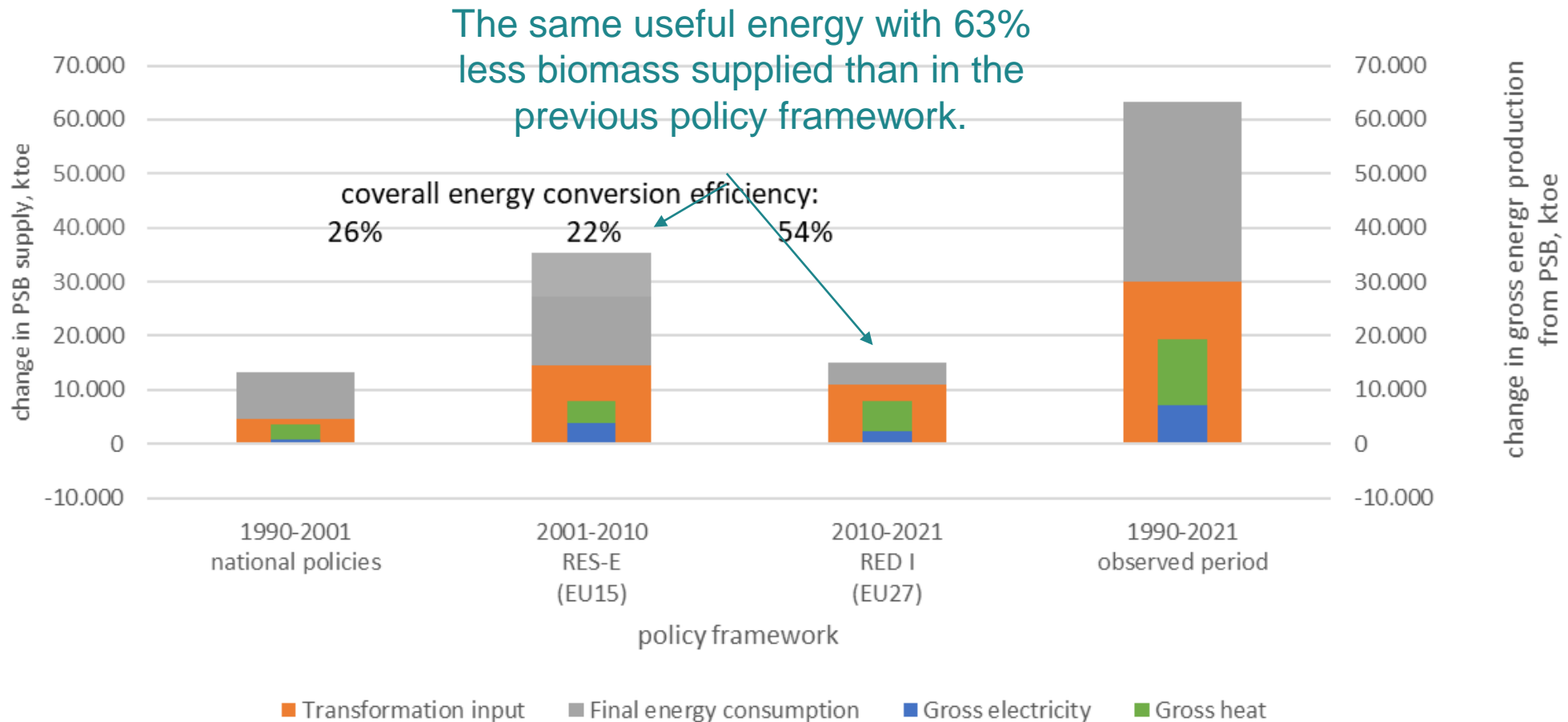
Difference of policy: EU15 and EU12 under RES-E directive 2001/77/EC



Different pathways of primary solid biofuels energy use between EU15 (RES-E) and EU12: exports are recorded in the EU12, not in the EU15; RES-E increment did not occur in the EU12 that joined the EU after that policy framework.

Doing more bioenergy with less biomass?

Evolution of primary solid biomass energy supply and consumption over policy frameworks



Thank you



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