



International developments on the production and use of solid biomass

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Content

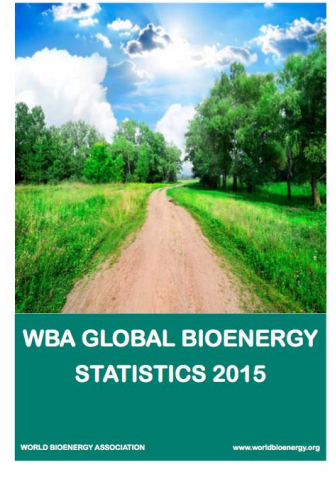


- Overview solid biomass
- Solid biomass: special issues
- Processed solid biomass
- New developments
- Conclusion
- About WBA

Global Bioenergy Statistics



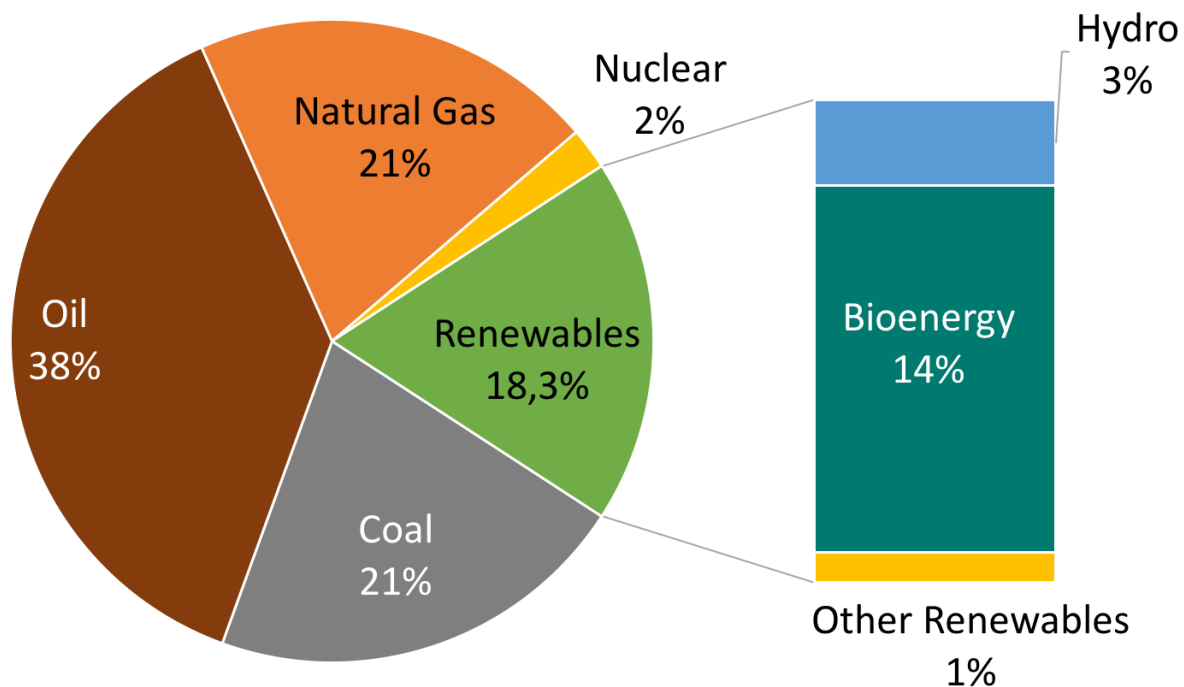
- Project started by WBA in January 2014
- Target
 - Publication of annual statistics report in June every year
- Scope
 - All bioenergy sectors incl. biofuels, biogas, pellets, charcoal etc.
 - Geographical distribution into global, continental and regional data
- Approach
 - WBA office in charge of data collection, analysis and publication
 - Guided by a steering committee of bioenergy experts
 - Collaboration with other international agencies like IEA, FAO, REN21, IRENA etc.



Gross final energy consumption



Final energy consumption of all energy sources - World 2013



The share of renewables has increased to 18.3% in 2013 (recent data suggests it crossed 19% in 2015).

UN Sustainable Energy for All (SE4All) expects doubling of this share to 36% by 2030.



What is solid biomass?



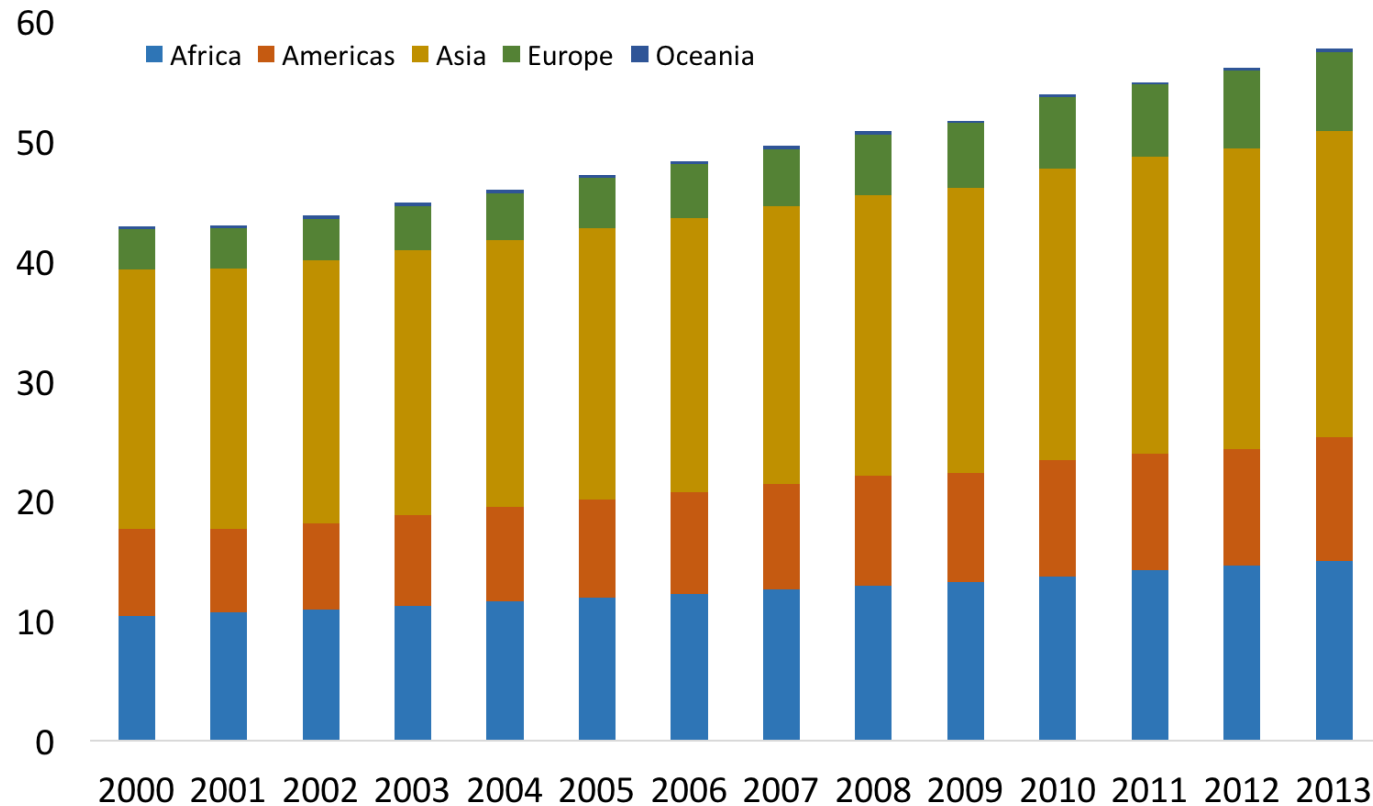
Origins of solid biomass:

- Forestry:
 - a) main use: wood fuel, stem wood
 - b) by-products, residues: bark, saw dust, chips, tops and branches, black liquor
- agriculture:
 - a) main use: short rotation coppices, energy grass, miscanthus etc.
 - b) by-products: straw, rice husks, fruit shells, kernels etc.
- waste: solid MW

Energy supply of biomass



Total primary energy supply of biomass - Continents



Bioenergy supply increased from 42.9 EJ to 57.7 EJ during 2000 – 2013.

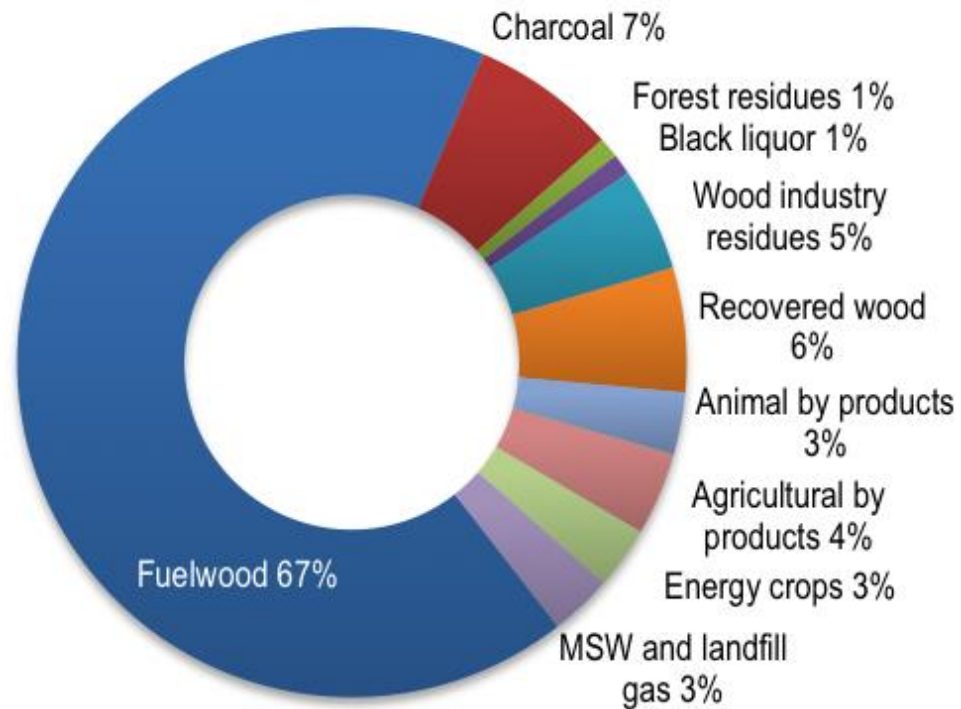
Asia has the highest supply of biomass



Overview of biomass supply



Overview of biomass supply sources



Most of the biomass supply is from the forestry sector (87%) followed by agriculture (10%) and wastes (3%).

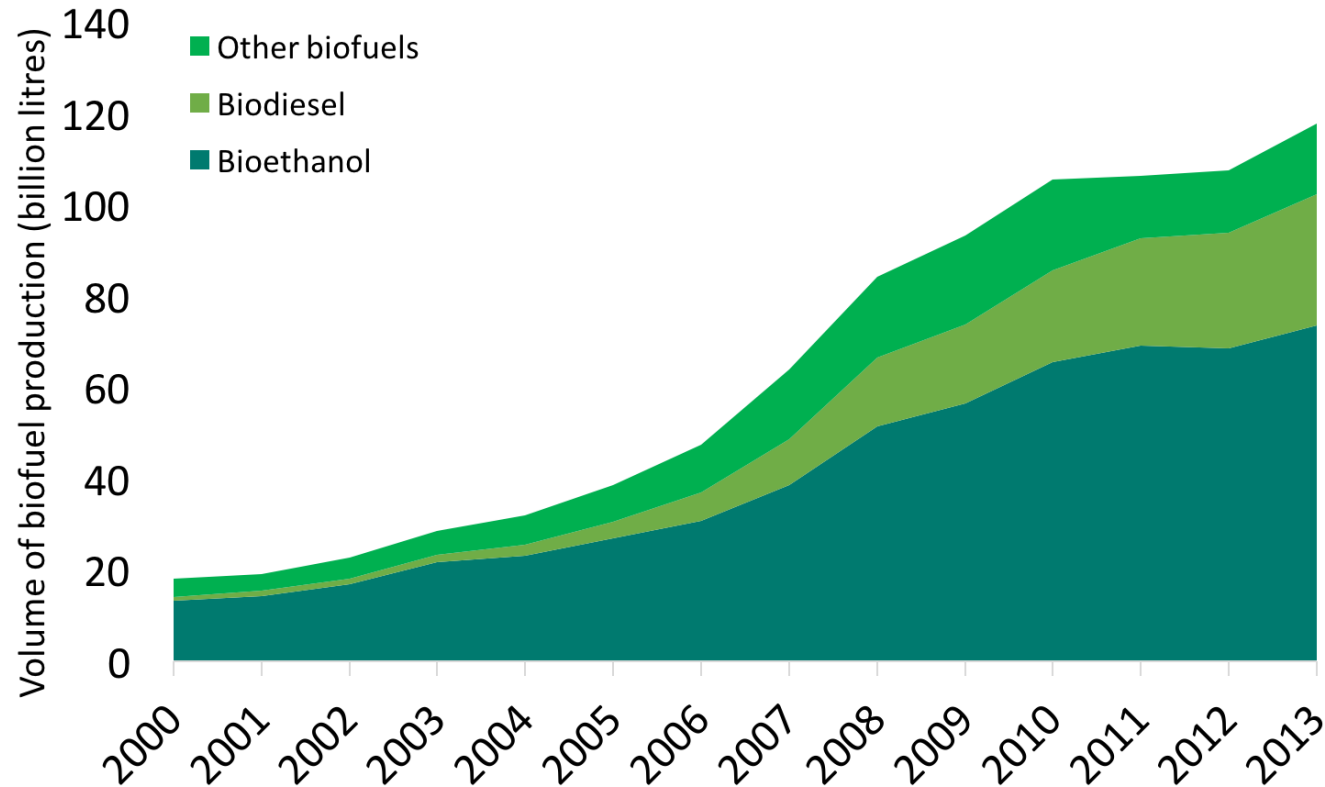
Fuelwood is the largest biomass resource globally.



Global biofuel production



Production of liquid biofuels globally



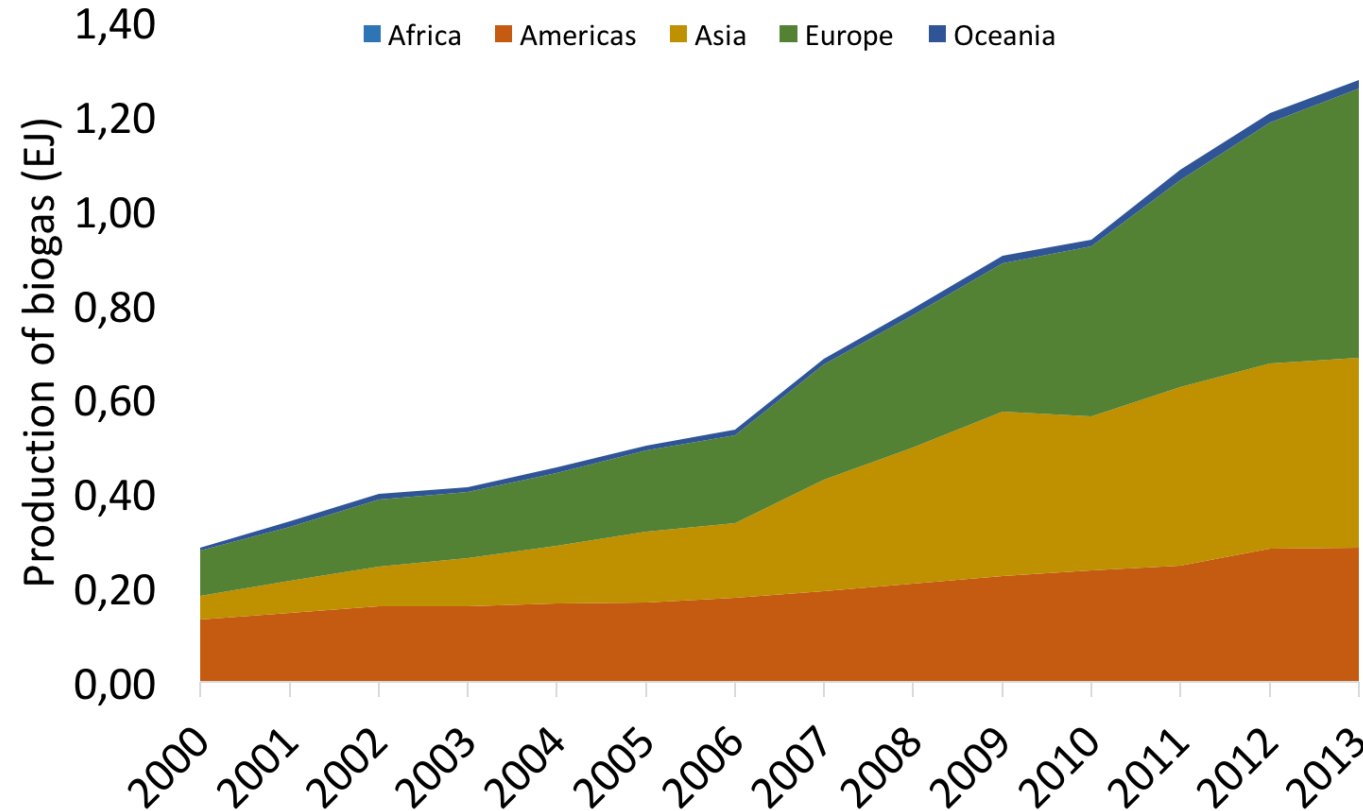
In 2013, 118 billion litres of biofuels were produced annually.



Biogas production



Global production of biogas



Biogas production increased 3.5 times during 2000 – 2012

Current production is at 1.3 EJ ~ 59 billion m³



Global development of biomass, 2000 – 2013

biofuels, biogas, solid biomass source: WBA, global bioenergy statistics



Solid biomass is the most important form of biomass for energy, More than 90%! Its biggest share comes from forests.
From 53.4 EJ solid biomass 48.1 EJ goes to heat, 5.3 EJ to electricity.

	2000, EJ	2013, EJ	Annual growth %
Biofuels	0,5	3,0	15
Biogas	0,3	1,3	12
Solid biomass	42,1	53,4	1,9
TOTAL	42,9	57,7	2,3



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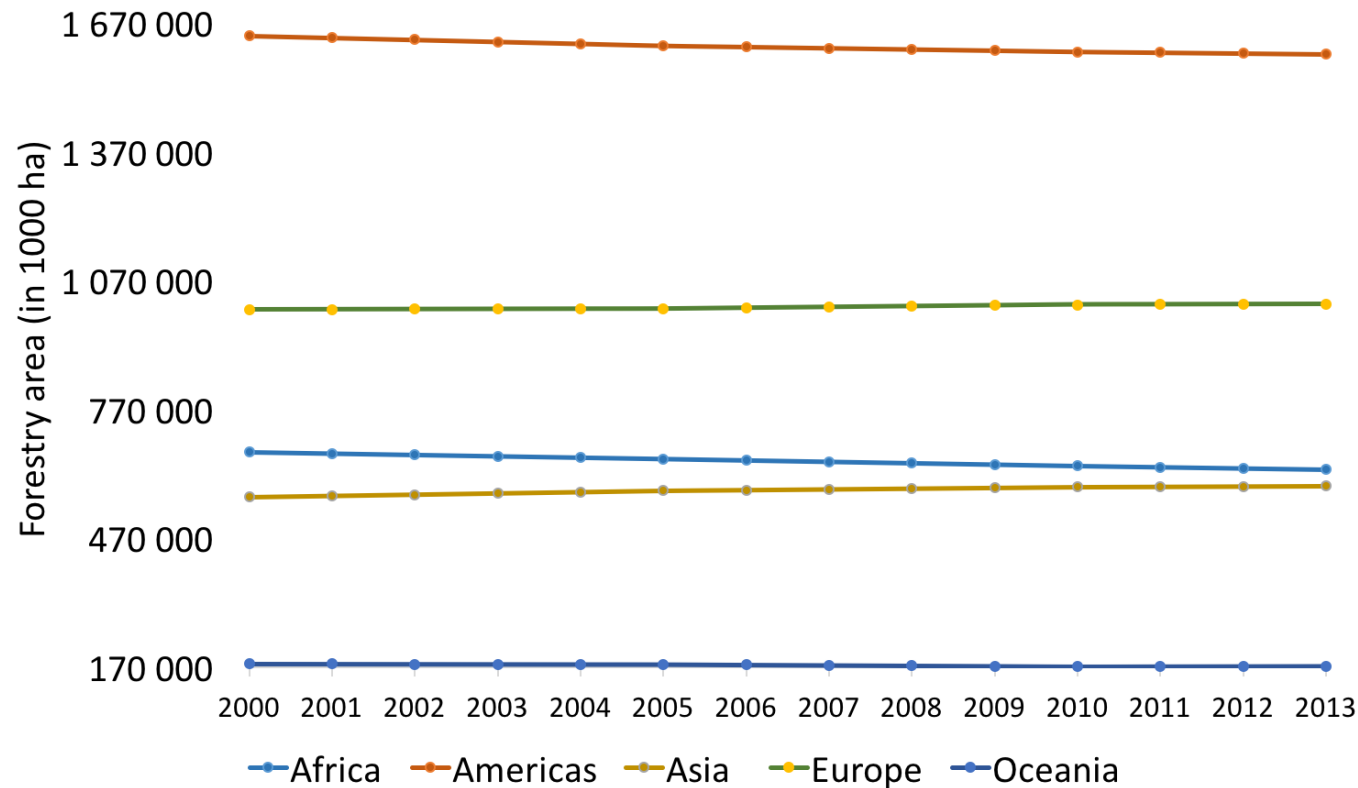


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Forestry area



Change of forestry area from 2000 to 2013



Forest area has decreased globally

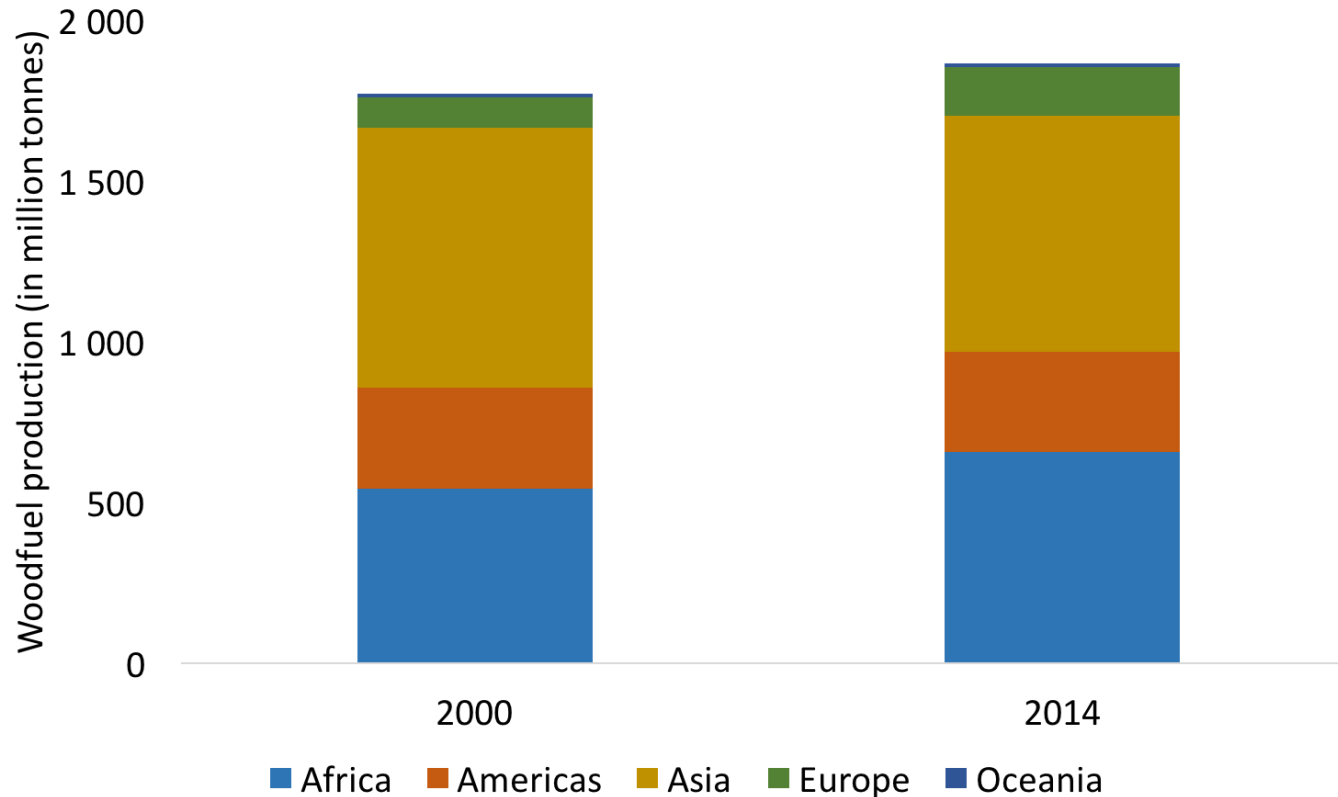
- World: -1.23%
- Africa: -6.06%
- Americas: -2.61%
- Asia: 4.51%
- Europe: 1.24%
- Oceania: -2.66%



Woodfuel production



Woodfuel production globally



In 2014, 1.8 billion tonnes of woodfuel was produced globally – mostly in Asia (737 million tonnes) and Africa (657 million tonnes).

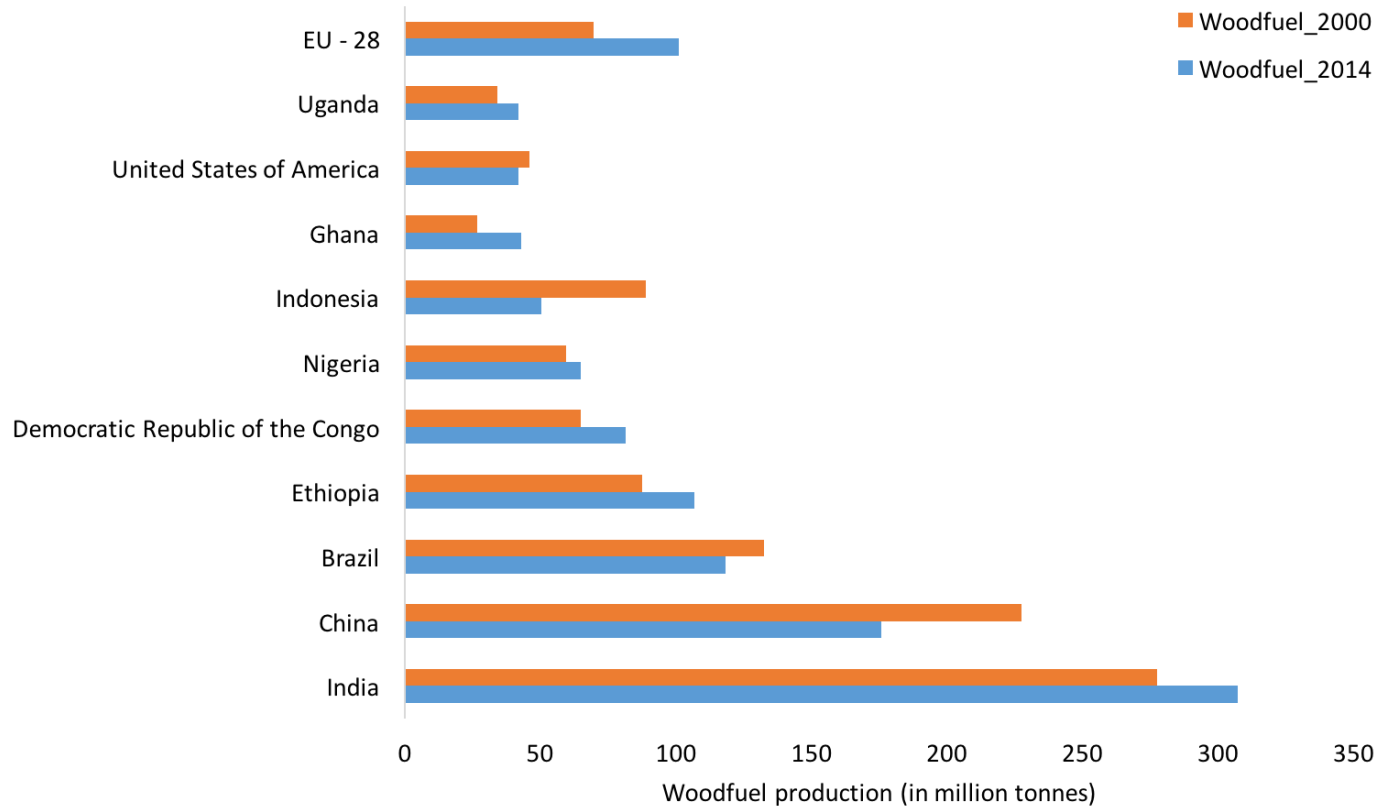
Since 2000, global woodfuel production increased by 5.25%



Woodfuel production



Woodfuel production in top 10 countries



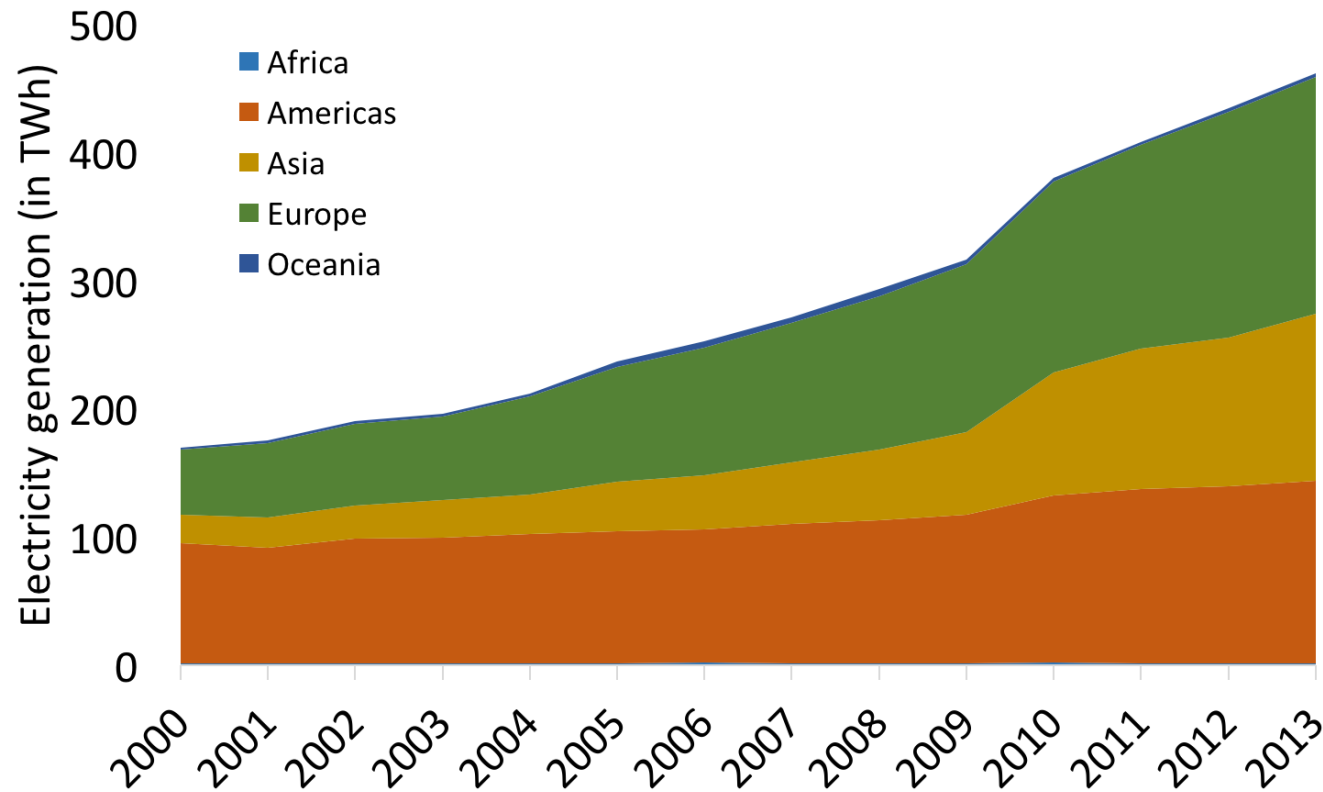
India is the world's largest producer of woodfuel in 2014 and has increased its production by 10.7% since 2000.

China reduced the production volumes by 23%. The third top woodfuel producer, Brazil, also reduced its production by 11%.

Electricity generation from biomass



Electricity generation from biomass



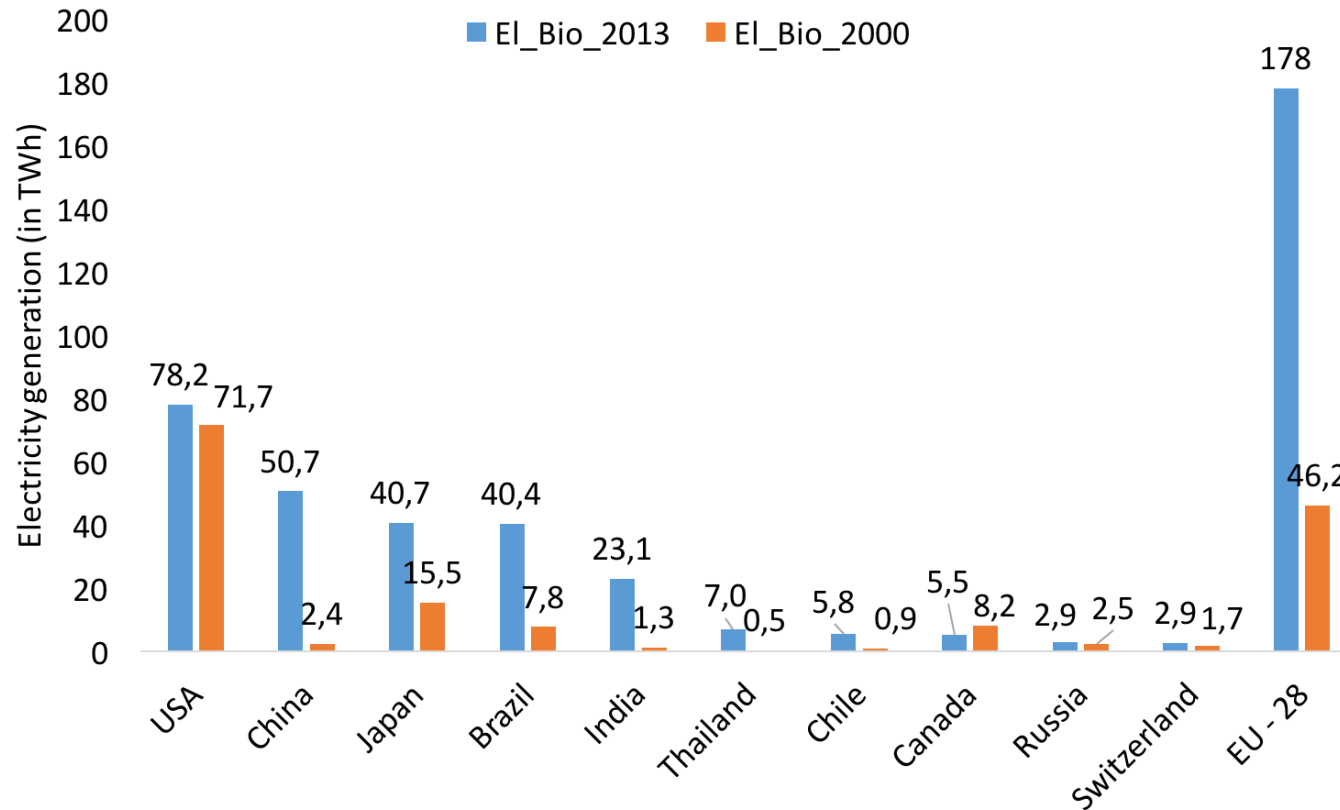
In 2013, 462 TWh of electricity was generated from biomass. 362 TWh from solid biomass, 100 TWh from biogas.

Europe is the largest producer of biomass electricity.

Electricity generation from biomass – Top 10 countries



Electricity from biomass in top 10 countries (in TWh)



USA and China are the largest producers of electricity from biomass.

In the top 10 countries, apart from Canada, the rest of the countries increased their production of electricity from biomass.



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Processed solid biomass

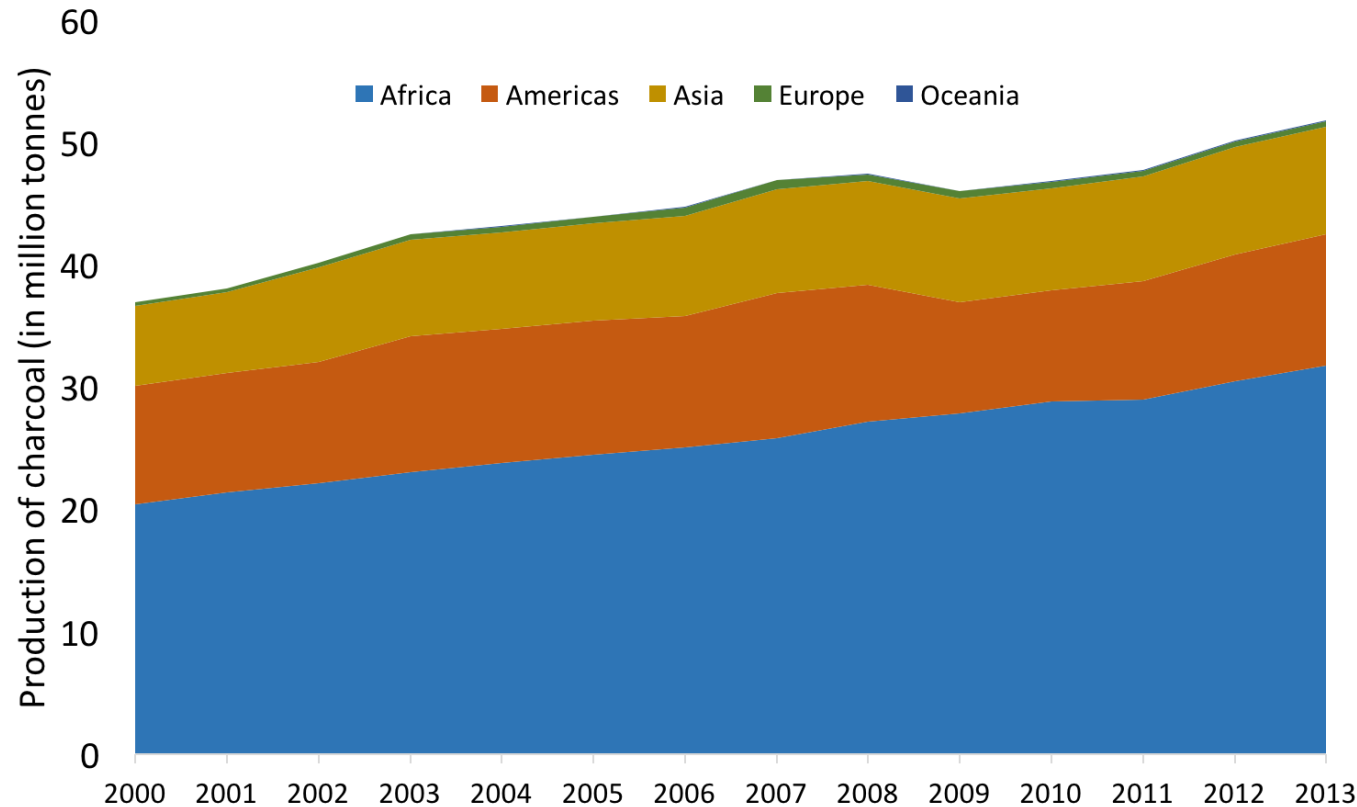


- * from forests: charcoal,
pellets
terrified wood
pyrolysis oil
- from agriculture: bales,
briquettes,
pellets

Charcoal



Global production of charcoal

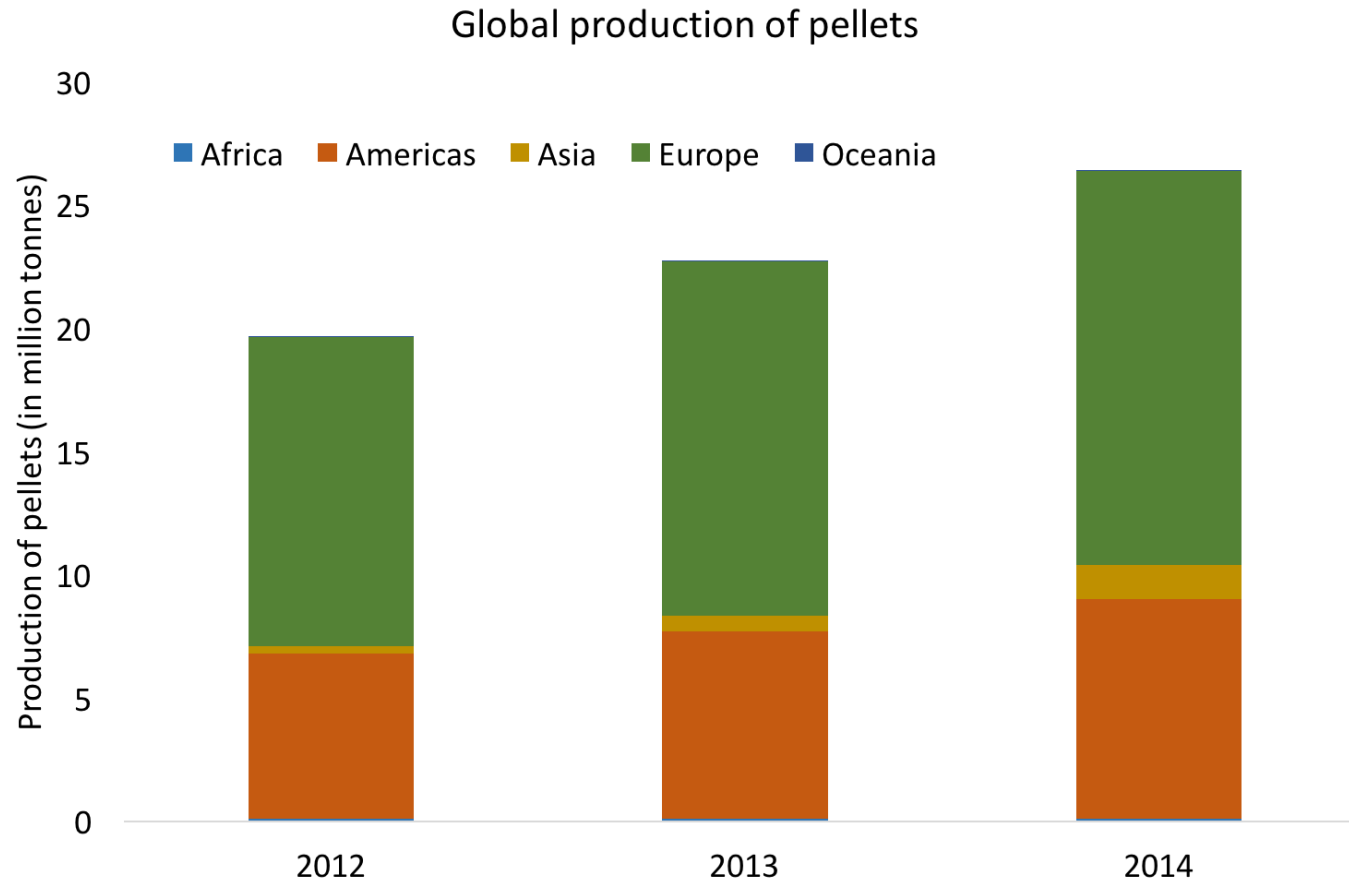


Charcoal – a highly underestimated sector.

More than 50 million tonnes of charcoal produced annually – mostly in Africa



Pellets

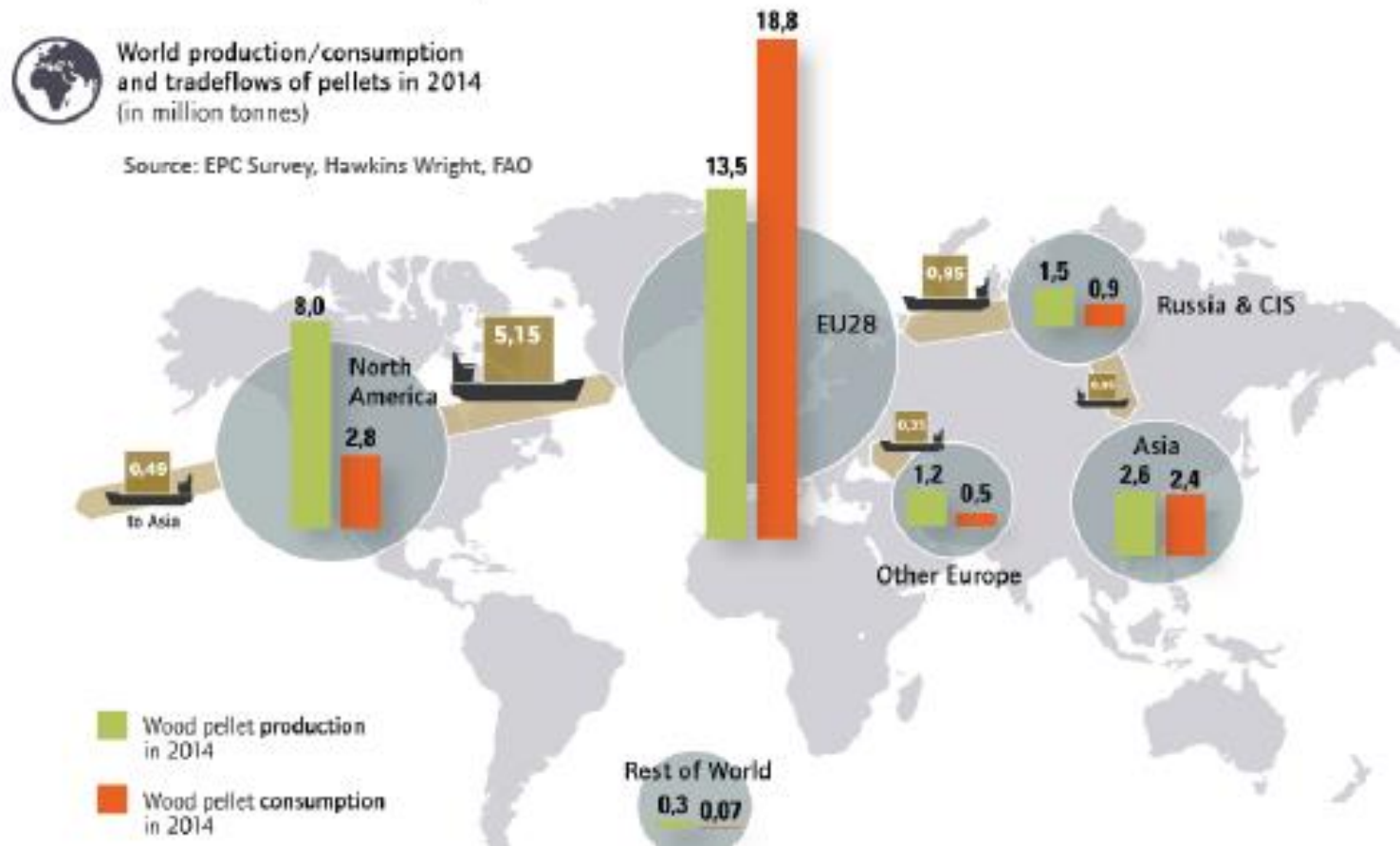


Pellets – one of the fastest growing bioenergy sector

Current production exceeds 25 million tonnes – predominantly in EU and USA



Overview: global pellet production



Straw bales as feedstock



**150 MW CHP power plant
Pecs, Ungarn
180.000 straw per year**



**WORLD BIOENERGY
ASSOCIATION**

The other use of straw: burning on millions ha



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New developments in the use of solid biomass



- New biomass gasification equipment, small scale, came to the market (50 – 200 kW el) allows high efficient heat driven electricity generation
- Increase interest in torrefied wood and pyrolysis oil as energy carrier with a high energy density
- New big biomass plants for DH heat started operation (Fortum Stockholm 330 MW)



New district plant PRIJEDOR; BOSNIA PRIJEDOR; BOSNIA, 2016



20 MWth, 1 MW el based on biomass gasification,
A heat driven CHP installation based on wood residues



New developments in general



- COP 21, the Paris Agreement, calls for an exit strategy for fossil fuels and an accelerated deployment of all renewables in all countries world wide
- The low oil prices hinders the transition to renewables and leads again to increasing CO2 emissions, also in Europe.
- **A new strategy is needed: carbon taxes instead of the ETS system.**



Solid Biomass and the Paris Agreement



- Alarming news, spring 2016: more than 403 ppm CO₂ in the atmosphere. Critical threshold 410 – 420 ppm!
- All countries should leave fossil fuels, developed countries should take the lead!
- Developing countries should go direct to renewables, should not build up a fossil structure.
- Consequences for trade: helps to develop the infrastructure for the use of biomass, in the long run exports from those regions with a structural over supply of sustainable biomass!

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COP 21: a fossil exit strategy for Europe (2013-2030-2045)

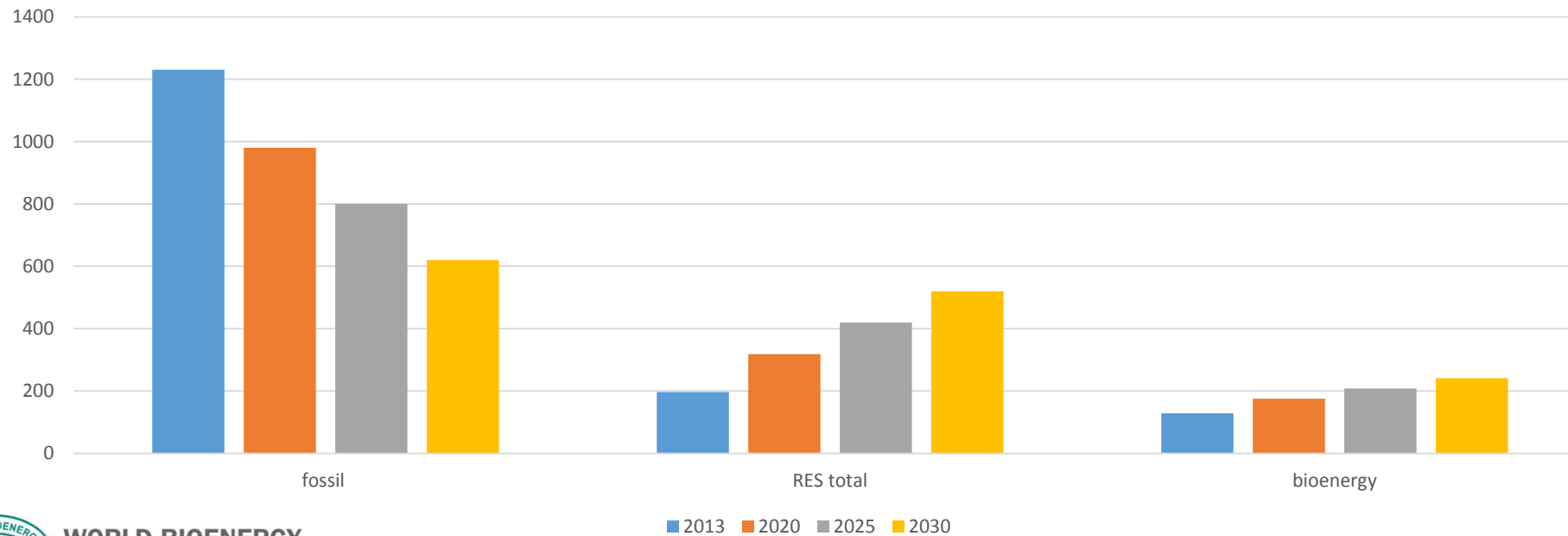


Stabilizing the CO2 concentration below 420ppm would require zero fossil fuels by 2030!

Here a scenario: -50% fossil fuels by 2030, and then zero by 2045 for the EU 28!

This means: 2030 no fossil electricity, 7 fold increase of wind, pv, and a share of 18% biomass (241EJ)

Europe: fossil exit 2013 - 2030, Mtoe



Conclusion solid biomass



- Bioenergy is the largest renewable energy source globally
 - 14% out of 18% share of renewables in the energy system
- Electricity production from biomass is the third largest among renewables – 3 times more than solar PV in 2013!
- Forestry sector is the largest contributor to the biomass supply (in the form of fuelwood and charcoal)
- Pellets is one of the fastest growing bioenergy sector – more than 25 million tonnes produced
- Charcoal is highly underestimated sector – larger than pellets in terms of energy and fuel use

About WBA



- World Bioenergy Association (WBA) is the global organization dedicated to supporting and representing the wide range of actors in the bioenergy sector. Our members include bioenergy associations, institutions, companies and individuals.
- WBA has been working to address a number of pressing issues including certification, statistics, knowledge and technology transfer, impacts on food, water and land use, and promoting bioenergy on a global level
- *Mission:* Promote the increasing utilization of bioenergy globally in an efficient and sustainable way and to support the business environment for the bioenergy.
- *Webpage:* www.worldbioenergy.org

Organization



- Governed by the board
 - 19 board members
 - 17 different countries
 - Representing all sectors of bioenergy from all continents
 - Industrialists, researchers, farmers, consultants etc.
- Secretariat
 - President – Dr. Heinz Kopetz (Austria)
 - Office – Karin, Bharadwaj, Remigijus, Viktorija, Pranav, Leia
- Membership
 - More than 190 members from 50 countries

Activities



- Global Bioenergy Statistics
- Bioenergy Equipment Directory
- Factsheets
- Country mission reports
- Setting up bioenergy associations
- Workshops, webinars and side events
- Bioenergy action plans
- Sustainability label

Thank you!



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