A global look at the world of bioenergy

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World Bioenergy Association

- Global industry association based in Stockholm
- Established in 2008
- **Mission**: Promoting the sustainable development of bioenergy
  - International advocacy
  - Platform for engagement
- Members – Pellet producers, utilities, research institutions, boilers/gasifier manufacturers, pellet mills, briquette manufacturers, heating companies etc.
- Coverage: Solid, liquid and gaseous fuels

Energy Supply

- The reality is that our energy mix is dominated by fossil fuels – coal, oil and gas
- In terms of energy supply (approx. 560 EJ), fossil fuels account for 81%
- Renewable share is constant (14%) since the start of the century – increased re deployment matched by increasing consumption
- **Bioenergy** is the largest renewable energy source globally

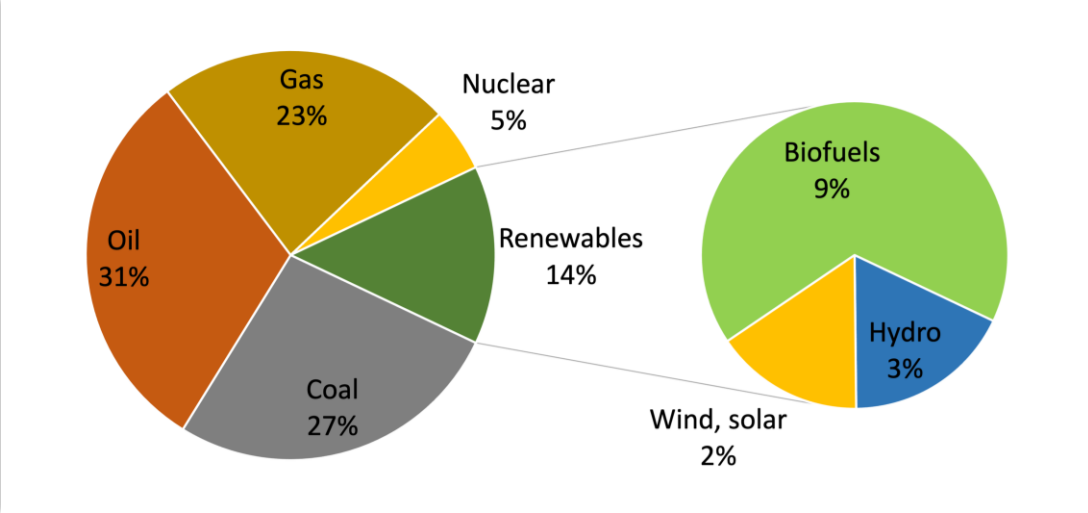
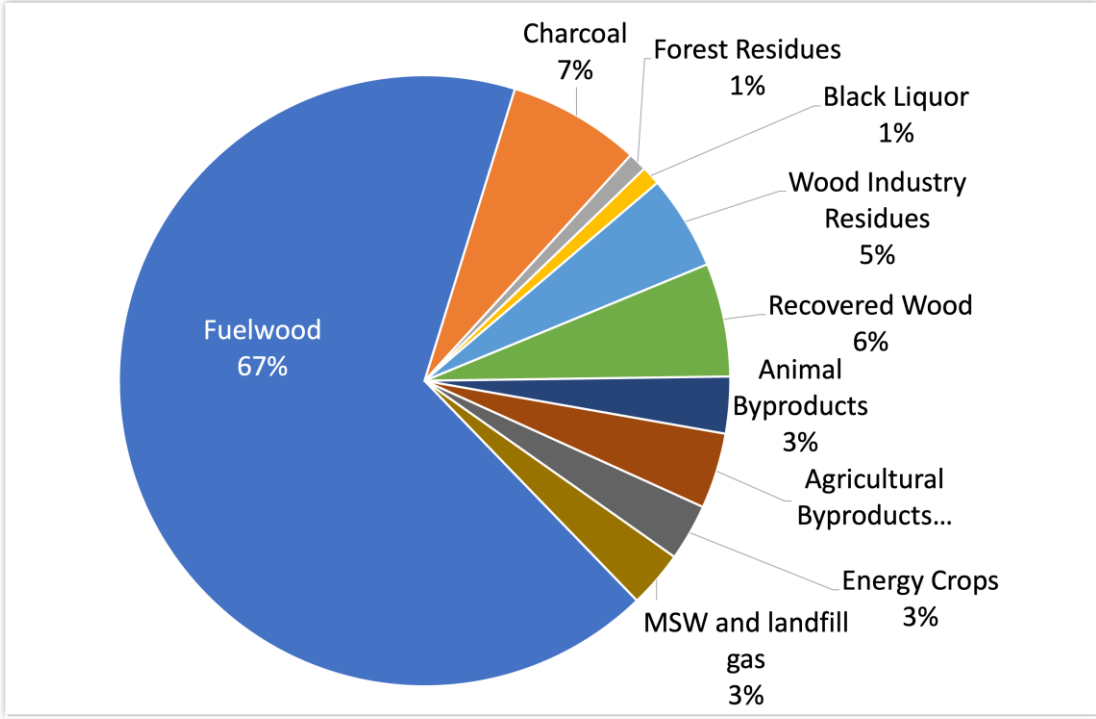


Figure: Total primary energy supply globally (Source: IEA Energy Statistics)

Where is the biomass coming from?

- Biomass accounts for about 10% of the energy supply
- Currently, forestry sector (traditional and modern) accounts for about 85% of the biomass supply
- Agriculture/Animal sector accounts for approx. 10% of the supply – expected to grow further
- Minor share from MSW/Landfill gas



Biopower and Bioheat

Bio power

- 680 TWh of electricity was generated from biomass based sources – 9% of overall renewable power
- Installed capacity in 2022: 150 GW in 2022 (5.3%)
  - Bagasse co generation in Brazil, India
  - CHP facilities in Europe (DE, SW, UK)
  - Waste to energy in China, rest of Asia
  - Biopower generation in USA (Maine, California)

Biopower

- 1.26 EJ of biomass heat was generated – 96% of all renewable heat in buildings, industry, commercial, forestry etc.
- Europe accounts for more than 90% of all bioheat produced globally
  - Possible due to large scale CHP facilities with District heating networks
  - Residential heating with pellets/chips boilers and stoves

Transport fuels

- Liquid biofuels (bioethanol, biodiesel and advanced biofuels) account for 4 % of the overall transport mix
- After a dip in 2020, liquid biofuel production has crossed pre pandemic levels: 164 billion litres
- Growth in Europe has stagnated over past few years and Asia (15%) overtook Europe (13%)
- Ethanol: USA (E10) and Asia (India – E10) next
- Biodiesel: Asia is experiencing significant growth mainly mandate driven in Malaysia (B20), Thailand (B10 – 7/5) Indonesia (B30) etc.

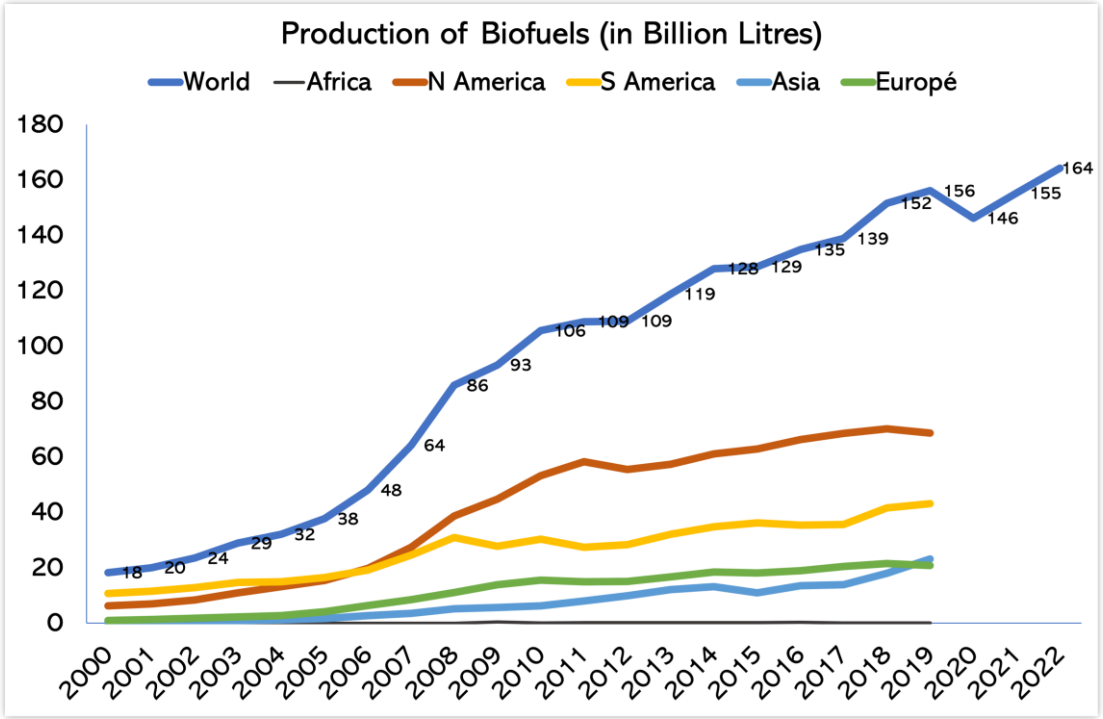


Figure: Production of liquid biofuels (IEA, EIA)

Opportunity – Cofiring with coal

India

- 5% of co firing with coal translates to roughly 35 million tonnes annual consumption
- Order already placed for 4.3 million MT by 35 power plants
- Focus on local production and use of local equipment
- Financial incentives available

China

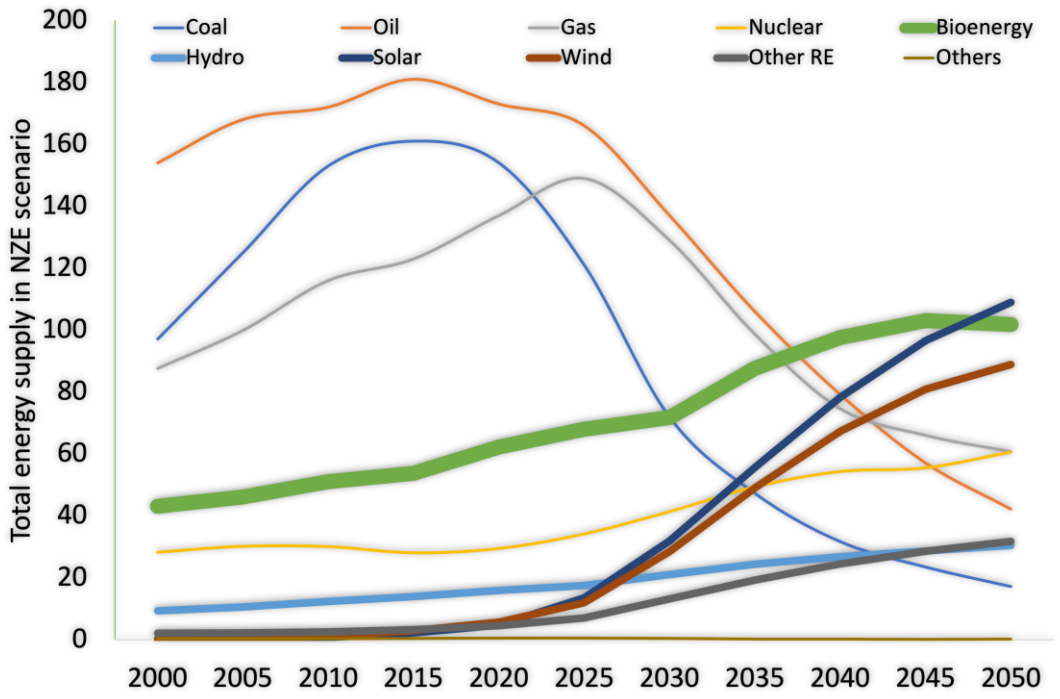
- Climate neutral pledge by 2060
- According to the recent 5 year plan,
  - Need to replace : 650 000 industrial boilers (3.5 TW – 85% coal)
- Rate of transformation is impressive
  - E.g. 500 MW coal fired power plant replaced with straw pellets in Northern China
- COVID restrictions a major hindrance, signs of easing up

Opportunity – Industrial decarbonization

- 1) Heineken / BE-CIS, Indonesia
  - 7 MW facility for producing steam
  - Replaced natural gas fired boiler – an cost saving example of gas to biomass in industry
  - Feedstock: rice husk and wood chips
- 2) Unilever / KIS Group, Singapore
  - 25 CBG plants, Total capacity of 387 000 m3
  - 110 million USD investment
  - Feedstock: Palm waste
- 3) Serum Institute / Thermax, India
  - Largest vaccine manufacturer
  - Shifted from gas to biomass for cost savings

Numerous examples in industries – food, beverage, pharmaceutical, FMCG, breweries

Future – IEA NZE Pathway



- Sustainable bioenergy delivers emissions reductions across a wide range of area:
  - Aviation, maritime, road transport, gas heating, coal in large power plants, clean cooking etc.
- In NZE scenario, bioenergy will be the 2nd largest fuel in 2050!!
- Not just doubling (50 – 100 EJ), but tripling of modern bioenergy solutions (30 – 100 EJ)

Opportunities for cooperation

- Development of bioenergy sectors is dispersed: Co firing – India, China, Ethanol in transport – India, China, Biodiesel in transport – Indonesia, Thailand, Malaysia, Dedicated biopower facilities – South Korea, Japan, Pellet production – Vietnam
- Majority of ESCAP countries have similar conditions: fossil fuel dependency (imported) in grids/transport, abundant local resources, need for creating jobs, reducing pollution etc.
- Bioenergy is important in all net zero transition pathways, scale and pace critical
- All technologies and pathways are critical
- Better coordination among the regions (e.g. exchanging case studies, feedstock assessments, region specific events on particular technology/feedstock, joint policy recommendations) would speed up the transition
- Improved regional cooperation also would address a key aspect of bioenergy: *Sustainability!*

Thank you!

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