Further improve framework for international biomass and biofuel trade

Deploy small-scale CHP systems with high electricity generation and overall cost-efficiency

International trade in biomass and biomass intermediates

Note: Bioenergy use in the buildings sector is for both heating and cooking. Demand for transport fuels is not shown here since this has been discussed in a previous IEA roadmap.

Align bioenergy sustainability policies with agricultural, forestry and rural development policies

This roadmap aims at the deployment of advanced technologies, systems and policies that will enable a significant increase in the use of bioenergy in the coming decades. The key features of the roadmap are:

- Biomass heat and electricity can already be competitive with fossil fuels under a CO2 price.
- Smaller-scale (<10 MW) plants have relatively low costs. Smaller-scale (<10 MW) plants have relatively low costs.
- Efficient, with very low life-cycle GHG emissions.
- Lower electric efficiencies and higher generation costs, if the feedstock can be produced sustainably and used efficiently, with very low life-cycle GHG emissions.

Key actions

- Introduce internationally aligned technical standards for biomass and biomass intermediates to ensure trade and tap new feedstock sources.
- Introduce differentiated economic incentive schemes, linked to sustainability certification, for both electricity and heat – to be phased out over time.
- Foster transition of traditional biomass use to more efficient and sustainable energy access by deploying advanced cookstoves and provide access to clean fuels (biogas, bio-ethanol).
- Set medium-term targets for bioenergy heat and power (CHP) plants, including their complete life-cycle performance.
- Increase research efforts on development of bioenergy feedstocks and establish large-scale field trials to identify the most promising feedstock types and locations for future scale-up.
- Gradually replace standing coal-fired assets with high efficient, utility-scale electricity and CHP biomass plants to ensure efficient CO2 capture.
- Foster regional capacity building to promote best practices in the agricultural and forestry sectors in developing countries.
- Re-design agricultural policies in particular in developing countries based on sustainable land-use management.
- Adopt instruments for the promotion of sustainable land use, such as sustainability certification schemes, effective legal regulations, and agriculture development programs, as well as support measures that improve efficiency (logistics and waste reduction) and productivity of agriculture, livestock production, and... develop integrated biomass supply chains that can supply food, fibre and fuels in a cost- and resource-efficient manner.
- Set clean energy access targets and pursue those vigorously by providing a supportive framework for private sector investments in the sustainable expansion of bioenergy to increase investor confidence and allow for creation of viable supply chains for advanced biomass feedstocks along with the creation of viable supply chains for advanced biomass feedstocks along with the creation of viable supply chains for... development of integrated biomass supply chains that can supply food, fibre and fuels in a cost- and resource-efficient manner.
Bioenergy for Heat and Power

Regional bioenergy electricity generation and final consumption of bioenergy in the buildings sector and industry

Bioenergy electricity generation costs 2010 and 2030, compared to coal and natural gas based power generation

CO emission reductions from bioenergy electricity and bioenergy use in industry and buildings compared to a business as usual (6°C Scenario)

Investment needs (billion USD) in bioenergy electricity generation capacity, including co-firing, in different world regions

Note: This assessment relates to mean scenarios with only high cycle assumptions.