

# **Biomass for energy in Israel**

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## **Abstract**

Biomass is one of the renewable energy sources available to the economy. Unlike the burning of fossil fuels, the burning of biomass, directly or indirectly, does not produce excess carbon dioxide (CO<sub>2</sub>) and does not alter the ecological balance of the planet, because in the growth process it has assimilated the same amount of CO<sub>2</sub> through photosynthesis as produced during burning. According to the U.S. Energy Information Administration, biomass accounts for 4% of the world's energy demand, along with 3% from hydroelectric sources and 6% from nuclear sources, while 85% are supplied by fossil fuels - coal, oil and gas. Only about 2% are provided by other sources of renewable energy - solar and wind.

Various sources of biomass are available in Israel, mainly from agricultural and municipal waste, and partially from industrial waste: vegetable waste, yard waste, plastic waste, animal secretions and carcasses, municipal organic waste and muck and sludge from sewage. Exploiting biomass for energy could solve two problems: Saving primary energy and removal of an environmental hazard.

The most common way to exploit biomass for energy is by direct combustion, in a controlled manner, in industrial facilities requiring heat or for the production of electricity. Another way is by turning biomass into biogas through the processes of digestion, gasification, pyrolysis and the like. Biogas can be utilized in various ways. It could be stored and burned in a clean and controlled process, more so than by direct combustion of biomass. Alternatively, it is possible to use it to produce bio-fuels to replace conventional fuels.

The use of biomass to generate electricity has been recognized by the Electricity Authority as a source of renewable energy and tariffs were set to encourage its usage. In terms of usage for electricity production, biomass has an advantage over the alternatives of solar and wind energy, being a continuous source of energy, similar to coal. Nevertheless, this option does not gather momentum, although in economic terms it is beneficial for both the electricity sector and the household waste sector, and has other external benefits. Israel lags behind the OECD countries in biomass utilization, largely due to the regulation that discourages and even hinders its implementation. A report by the OECD, released in March 2014, ranks Israel in the last place in terms of regulation. The subject falls between the cracks of government agencies and ministries. A broad systemic perspective is required to take all consequences into account.

## **Recommendations:**

1. It is recommended to establish a coordination mechanism for the relevant government organizations concerning biomass. Such a mechanism should include the Energy and Economy ministries and the Prime Minister Office (Directorate of Substitute Fuels), whose job is to encourage and expand the use of this renewable energy source. It should also include the Ministry of Environmental Protection and

the Ministry of Health, whose role is to set recycling limits and to ensure that the use of waste will be done in an environmentally responsible and healthy manner (e.g., feeding animals with waste, including used oil). Also, the Agriculture Ministry should be responsible for the treatment of agricultural waste and for using this energy for agricultural purposes, and the Ministry of Finance should allocate adequate budgets and tax benefits. Finally, the Public Utility Authority - Electricity, which is the organization that ultimately determines the rates that will determine the viability of technologies, should also be involved. A comprehensive view on the subject is required.

2. The regulation has to be updated and monitoring and enforcement intensified on waste disposal channels that do not involve recycling, to increase the feasibility of treating waste in a manner that would encourage the use of biomass. One way is to increase landfill levies, and penalize anyone who disposes of the waste (such as used cooking oil) not in designated areas.
3. The most appropriate uses of each type of biomass and per application should be examined. Common combustion of biomass with other fuels (co-firing), in electricity production and industries such as cement, is close to economic viability in most cases, because burning facilities already exist and the capital has been invested already; therefore, this option should be considered, if relevant.
4. The National Directorate for the Advancement of Oil Substitutes for transportation should also deal with the policy side and examine how to accelerate the use of bio-fuels. The dilution obligation and the obligation to produce a certain amount of bio-fuels by each manufacturer (as is common in the U.S.) could be the tools to promote the issue.
5. Ways to encourage the development of the biomass industry in Israel should be examined. The domestic market is small, but there is significant export potential to other countries, where waste should be turned into a resource rather than a burden. Therefore, facilities should be established in Israel to serve as a demonstration.