

ALTERNATE ENERGY SYSTEMS *

Listings are in order of their estimated utility.

1. Conservation (decreases demand by at least 35%)
2. Wind electricity generation (economic today) **
3. Direct solar. **
 - b. Solar thermal electricity generation (trough-system economic today).
 - c. Photovoltaic thin films (almost certainly best and barely economic today.)
 - d. Photovoltaic crystal cells (barely economic today).
 - e. Photovoltaic ribbons (potentially economic with development).
 - f. Ocean thermal gradient electricity generation (perhaps economic in some very limited regions).
 - g. Microwave relay from space platforms (undoubtedly uneconomic),
 - h. Solar ponds (probably not economic).
4. Geothermal.
 - a. Hot rock (being tested and may be worthwhile).
 - b. Hot brine (only hybrid system may be economic).
5. Methane or biogas from organic solid material in both rural and urban areas plus algae, hyacinth plants and kelp (possibly economic but requires extensive planting).
6. Alcohols from crops like wheat, corn, sugar cane, potatoes, etc. (possibly economic but requires extensive planting).
7. Ocean water movement. **
 - a. Current flow (possibly economic but limited to specific regions).
 - b. Tide changes (" " " " " " " ").
 - c. Vertical wave motion (probably not economic).
8. Wood for heating and electricity generation (air pollution problems from particulates and environmental problems from deforestation).
9. Fusion (probably never economic, if ever developed, because of system complexity and decommissioning costs because of the structure being irradiated).
10. Trash oxidation for electricity generation (15% of urban requirements, but has formidable air pollution and toxic waste problems which result in recycling and composting being much more desirable).

Final long term energy solution will be the use of a number of different techniques in each particular region. There will be no one overall solution applicable everywhere. Each particular area of the country will have its own unique energy system mix; however, wind and direct solar can be expected to be used extensively.

* Hydro is not listed because it is already used as extensively as possible.

** Energy storage is a problem for (2), (3), and (7) with pumped hydro being excellent when possible. Hydrogen from solar electricity is an energy storage technique which is used for fuel in an internal combustion engine, ICE, or electricity generation in a fuel cell. This will probably prove to be uneconomic.

