

# Wind, Solar and Bio-Gas Information Resources

(From March 9, 2010 Renewable Energy Seminar)

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## *Wind Power*

▶▶ **Consumer's Guide To Small Wind Applications** – 25 pages  
From DOE's Energy Efficiency & Renewable Energy Program (EERE)

[www.eere.energy.gov/windandhydro/windpoweringamerica/small\\_wind.asp](http://www.eere.energy.gov/windandhydro/windpoweringamerica/small_wind.asp)

There are also state-specific versions of this booklet, available at the site above.

▶▶ **Choosing a Home-Sized Wind Generator** -13 pages  
Home Power Magazine, 2002, 17 pages

Located at:

[www.focusonenergy.com/data/common/dmsFiles/W\\_RI\\_MKFS\\_Apples%20and%20Oranges.pdf](http://www.focusonenergy.com/data/common/dmsFiles/W_RI_MKFS_Apples%20and%20Oranges.pdf)

### ● **Maps of Wind Resources:**

Wind Powering America (EERE site for consumers):

[www.eere.energy.gov/windandhydro/windpoweringamerica/index.asp](http://www.eere.energy.gov/windandhydro/windpoweringamerica/index.asp)

Ohio: [www.windpoweringamerica.gov/where\\_is\\_wind\\_ohio.asp](http://www.windpoweringamerica.gov/where_is_wind_ohio.asp)

Wind Map Sources from *Ohio Wind Working Group* ([www.ohiowind.org](http://www.ohiowind.org))

[www.ohiowind.org/Maps.cms.aspx](http://www.ohiowind.org/Maps.cms.aspx)

Any State Wind Map (at 50 meters):

[www.eere.energy.gov/windandhydro/windpoweringamerica/wind\\_maps.asp](http://www.eere.energy.gov/windandhydro/windpoweringamerica/wind_maps.asp)

NOAA Solar & Wind Data Page: [www.ncdc.noaa.gov/oa/reds/](http://www.ncdc.noaa.gov/oa/reds/)

Wind Atlas (NREL): <http://rredc.nrel.gov/wind/pubs/atlas>

● **Wind Energy Web Sites:**

[www.nrel.gov/learning/re\\_wind.html](http://www.nrel.gov/learning/re_wind.html) National Renewable Energy Lab.

[www.wind-works.org](http://www.wind-works.org) Site developed by recognized wind expert & author Paul Gipe

[www.GreenEnergyOhio.org](http://www.GreenEnergyOhio.org) Green Energy Ohio organization

[www.awea.org](http://www.awea.org) American Wind Energy Association:

[www.buckeyepower.com](http://www.buckeyepower.com) Current information on wind generator demo. (10 kW)  
Indian Lake H. School

[www.poweredgenerators.com/wind-power-generators.html](http://www.poweredgenerators.com/wind-power-generators.html) Multiple items  
on wind energy

● **Homeowner-Sized Wind Generation Resources:**

EERE's sub-site for homeowner-sized wind resources:

[www.eere.energy.gov/windandhydro/windpoweringamerica/small\\_wind.asp](http://www.eere.energy.gov/windandhydro/windpoweringamerica/small_wind.asp)

Consumer's Guide To Small Wind Applications; DOE - Energy Effic. & Renewable Energy (EERE):

[www.eere.energy.gov/windandhydro/windpoweringamerica/small\\_wind.asp](http://www.eere.energy.gov/windandhydro/windpoweringamerica/small_wind.asp)

"Choosing a Home-Sized Wind Generator", 17-page article, Home Power Magazine, 2002

[www.focusonenergy.com/data/common/dmsFiles/W\\_RI\\_MKFS\\_Apples%20and%20Oranges.pdf](http://www.focusonenergy.com/data/common/dmsFiles/W_RI_MKFS_Apples%20and%20Oranges.pdf)

Calculator To Assess Wind Potential & Economics; **Bergey Windpower** site:

[www.bergey.com/Channels/1F2.htm](http://www.bergey.com/Channels/1F2.htm)

Farmers' Guide to Wind Energy: Legal Issues in Farming the Wind (both large-scale and small)

[www.flaginc.org](http://www.flaginc.org) then look for the PDF under Publications. The direct URL is  
[www.flaginc.org/topics/pubs/index.php#FGWE](http://www.flaginc.org/topics/pubs/index.php#FGWE)

[www.windustry.com](http://www.windustry.com) (Then click on "Your Wind Project" at top, then "Home & Farm Wind")

● **Small Wind Independent Testing (National Renewable Energy Lab):**

[www.nrel.gov/wind/smallwind/independent\\_testing.html](http://www.nrel.gov/wind/smallwind/independent_testing.html)

● **Large & Community Scale Wind:**

[www.eere.energy.gov/windandhydro/windpoweringamerica/large\\_wind.asp](http://www.eere.energy.gov/windandhydro/windpoweringamerica/large_wind.asp)

[www.windustry.com](http://www.windustry.com)

● **Inverters:**

Synchronous

Inverters

[www.sierrasolar.com/articles\\_categories.php?category\\_id=51](http://www.sierrasolar.com/articles_categories.php?category_id=51)

[www.solarpanelinfo.com/solar-panels/inverters/](http://www.solarpanelinfo.com/solar-panels/inverters/)

● **On-Line Calculators and Economic Estimators for Wind & Solar:**

[www.chooserenewables.com](http://www.chooserenewables.com) Offers estimates of wind and solar.

[www.dsireUSA.org](http://www.dsireUSA.org) – latest incentives for renewable energy by state

[www.infinitepower.org/calculators.htm](http://www.infinitepower.org/calculators.htm)

● **Vendors (partial List):**

[www.bergyc.com](http://www.bergyc.com)

[www.windenergy.com](http://www.windenergy.com)

[www.windturbine.net](http://www.windturbine.net)

[www.skystreamenergy.com](http://www.skystreamenergy.com)

[www.windpowerservicesllc.com/index.html](http://www.windpowerservicesllc.com/index.html)

[www.altestore.com](http://www.altestore.com)

[www.WindEnergy.com](http://www.WindEnergy.com)

[www.otherpower.com/otherpower\\_wind.shtml](http://www.otherpower.com/otherpower_wind.shtml)

## *Solar Power*

◆ **Overview of solar electric, including economics:**

<http://en.wikipedia.org:80/wiki/Photovoltaics>

<http://www1.eere.energy.gov/solar> Dept. of Energy solar site

◆ **Maps of Solar Resources:**

State Solar Maps:

<http://www1.eere.energy.gov/solar/>

<http://www1.eere.energy.gov/solar/tools.html> This leads to the sites below:

<http://www1.eere.energy.gov/solar/characterization.html> this leads to:

[http://rredc.nrel.gov/solar/old\\_data/nsrdb/](http://rredc.nrel.gov/solar/old_data/nsrdb/)

◆ **Homeowner-Sized Solar Generation Resources:**

[www.TheSolarGuide.com](http://www.TheSolarGuide.com) Includes solar-electric and solar-thermal

[www.DiscoverSolarEnergy.com](http://www.DiscoverSolarEnergy.com) Links to all things solar

[www.solarenergy.org](http://www.solarenergy.org) An international association of solar enthusiasts

[www.ases](http://www.ases) American Solar Energy Society

[www.findsolar.com](http://www.findsolar.com) Can be used to locate solar professionals in your area

[www.solar-rating.org](http://www.solar-rating.org) Solar Rating and Certification Program

[www.solar-estimate.org](http://www.solar-estimate.org) Provides estimates for solar & wind by zip code

[www.dsireusa.org](http://www.dsireusa.org) Lists state and federal subsidies for alternate energy

Field Guide to PV Systems, by Saturn Resources (PDF version is \$9.00):

[www.srmi.biz/Bookstore/Professionals.Field\\_Guide\\_to\\_Photovoltaic\\_Systems.htm#CFHIGHFH](http://www.srmi.biz/Bookstore/Professionals.Field_Guide_to_Photovoltaic_Systems.htm#CFHIGHFH)

◆ **Utility-Scale Solar Projects:**

[www.SolarElectricPower.org](http://www.SolarElectricPower.org) Solar Electric Power Association

# *Ag Bio-Gas Power*

## **I. National Organizations with Biogas Information:**

[www.epa.gov/agstar](http://www.epa.gov/agstar) This is the EPA's program to encourage reduction of methane from agricultural waste, using digesters.

[www.nrel.gov](http://www.nrel.gov) then enter search words "methane, manure". This is the National Renewable Energy Lab page on biogas. One useful item is a Case Book called "Methane Recovery From Animal Manures", a PDF available on their site at [www.nrel.gov/docs/fy99osti/25145.pdf](http://www.nrel.gov/docs/fy99osti/25145.pdf) . Also see: [www.nrel.gov/learning/fr\\_biopower.html](http://www.nrel.gov/learning/fr_biopower.html)

[www.nerc.org](http://www.nerc.org) This is the Rural Electricity Resource Council's site. From the tab "Energy Use, Elec. Wiring & Safety", click on "Green Power" then "Agricultural Methane Recovery".

[www.anaerobic-digestion.com](http://www.anaerobic-digestion.com) An international site with extensive information.

## **II. Regional & State Information Sources:**

[www.manuremanagement.cornell.edu](http://www.manuremanagement.cornell.edu) Cornell Univ. Manure Management site. There is a great list of case studies under "Documents" then "Case Studies", with details on economics and some photos

[www.cqlg.org/biomass](http://www.cqlg.org/biomass) is the Great Lakes Governors biomass group. They have another Case Book, just scroll down and click to get PDF.

[www.mnproject.org](http://www.mnproject.org) then select the tab "Renewable Energy" and look for methane.

[www.mrec.org](http://www.mrec.org) Midwest Rural Energy Council site. Click on "Energy Generation". There is quite a bit on methane recovery.

[www.seco.cpa.state.tx.us/re\\_biomass-manure.htm](http://www.seco.cpa.state.tx.us/re_biomass-manure.htm) Texas Dept of Energy, with good information on large western dairies.

## **III. Utility Programs or Case Studies:**

[www.cvps.com/cowpower/](http://www.cvps.com/cowpower/) Central Vermont Public Service, "cow power" program. This is a great animated site, which also describes their very active program..

**[www.dairynet.com/energy\\_resources/animal.php](http://www.dairynet.com/energy_resources/animal.php)** Dairyland Power, a G&T in Wisconsin has a program for farmers, where they buy the gas & own the generation.

**[www.portlandgeneral.com](http://www.portlandgeneral.com)** then do a search using "biogas". Portland General Electric is a utility in the Northwest

**[www.wapa.gov/es/pubs/esb/2006/dec/dec068.htm](http://www.wapa.gov/es/pubs/esb/2006/dec/dec068.htm)** Western Area Power Admin. Newsletter article, overviews the system at Midwest Dairy Institute in South Dakota.

**[www.nppd.com/our\\_community/environment/additional\\_files/methane.asp#](http://www.nppd.com/our_community/environment/additional_files/methane.asp#)** Nebraska Public Power District, provides an overview of OLean pork facility in Nebraska

**[www.pge.com/pipeline/library/industry\\_links/biogaslist.shtml](http://www.pge.com/pipeline/library/industry_links/biogaslist.shtml)** Pacific Gas & Electric Company, mentions their program to buy biogas. Also a long list of vendors.

#### **IV. System Venders and Consultants:**

1. **Environomics** and consultant Richard Mattocks is at [www.waste2profits.com](http://www.waste2profits.com)
2. **RCM Digesters** is at [www.rcmdigesters.com](http://www.rcmdigesters.com)
3. **Microgy Inc.** at [www.microgy.com](http://www.microgy.com)
4. **Onsite Power Systems** at [www.onsitepowersystems.com](http://www.onsitepowersystems.com)
5. **Synagro Technologies** at [www.synagro.com](http://www.synagro.com)
5. **Phase 3 Developments & Investments** at [www.phase3dev.com](http://www.phase3dev.com) Located in Cincinnati, OH does feasibility studies on biogas projects; have operating digesters in several states.
6. **GHD Inc. Anaerobic Digesters** [www.ghdinc.net](http://www.ghdinc.net)
7. **Agri-Waste Energy** [www.agri-waste.com](http://www.agri-waste.com) One of the owners, John Vrieze owns 2 large dairies in WI, Emerald Dairy, Baldwin Dairy and, related enterprises at [www.vriezefarms.com](http://www.vriezefarms.com).
8. **Bio-Gas Energy Inc.** [www.biogas-energy.com](http://www.biogas-energy.com) A full-service construction firm for waste digesters, located in Seattle, WA.
9. **Stormfisher Biogas** [www.stormfisher.com](http://www.stormfisher.com) Located in Toronto, Ontario, they operates across North America.

**Ohio-Specific Information and Other Sites:**

**[www.ohioagriculture.gov/oda3/ Apps/LEPP PermittedFarms/Default.aspx](http://www.ohioagriculture.gov/oda3/Apps/LEPP_PermittedFarms/Default.aspx)**

Ohio

Dept. of Agriculture list of all large livestock farms, location & number of animals.

**[www.fppcinc.org](http://www.fppcinc.org)** Farm Pilot Project Coordinators is a non-profit designated by Congress to assist large animal farms in managing waste.

**[www.epa.gov/agstar](http://www.epa.gov/agstar)**