

Appendix

APPENDIX A

Comparison of Costs for Selected Energy Technologies

APPENDIX B

Financial Assistance Programs for Renewable Energy Projects

The table presented in Appendix B was prepared in 2002 by the Minnesota Department of Agriculture. The first two pages list loan programs, and the next two pages list incentive payments, tax credits, and grants for renewable energy systems. In addition to the programs listed here, since this fact sheet was published, the following grant program was established:

USDA Renewable Energy Systems and Energy Efficiency Improvement Grant and Loan Program. This provides up to \$23 million nationally for renewable energy projects and energy efficiency projects for farmers and rural small businesses. (www.rurdev.usda.gov/rd/farmbill/9006resources.html)

In addition, a federal tax credit is being considered in Congress that would provide a tax credit for each kWh generated from farm biogas systems.

A good source of up-to date information on both federal and state incentives is the Database of State Incentives for Renewable Energy (DSIRE) (www.dsireusa.org)

APPENDIX A: COMPARISON OF COSTS FOR SELECTED ENERGY TECHNOLOGIES

There are a wide range of cost estimates for various energy technologies, and the following table represents just one estimate. Please keep in mind the following when reviewing this table:

- The cost figures here are by no means definitive, but rather provide a rough estimate of costs across technologies. See also: *Renewable Energy Technology Characterizations*, EPRI/US DOE, 1997. (www.eere.energy.gov/power/techchar.html)
- The costs estimates below are for *new* plants – generating costs of existing plants may be substantially lower (especially for coal and nuclear)
- The costs also do not include operating subsidies, which may also lower the generating costs (e.g., wind energy is eligible

to receive a 1.8 cent/kWh tax incentive, which is not included in the estimates here). It also does not include R & D subsidies, which would increase the real cost of some of the technologies – for example, from 1947 to 1999, the nuclear industry received about \$145 billion in federal subsidies, or about 1.2 cents/kWh cumulative over that time period, which are not reflected in the costs reported here.

- The costs also do not include “externality costs,” or health and environmental costs, which in the case of the non-renewable technologies can significantly increase total generation costs. For example, studies have calculated the health and environmental impacts of some existing coal plants to be over 2 cents/kWh.

<i>Technology</i>	<i>Investment costs (\$/kW)</i>	<i>Total generating costs (¢/kWh)</i>
Non-renewable		
<i>Natural gas combined cycle</i>	<i>500-700</i>	<i>3.0-4.0</i>
<i>Coal</i>	<i>1,000-1,300</i>	<i>4.0-5.5</i>
<i>Nuclear</i>	<i>1,200-2,000</i>	<i>3.3-8.0</i>
Renewable		
<i>Wind</i>	<i>800-2,000</i>	<i>3.0-8.0</i>
<i>Biomass (25 MW)</i>	<i>1,500-2,500</i>	<i>4.0-9.0</i>
<i>Small hydro</i>	<i>800-1,200</i>	<i>5.0-10.0</i>
<i>Solar thermal electric</i>	<i>4,000-6,000</i>	<i>12.0-18.0</i>
<i>Solar PV</i>	<i>6,000-8,000</i>	<i>30.0-80.0</i>

Source: Peter Langcake, “Getting a Clear View: Strategic perspectives for renewable energy companies,” *Renewable Energy World*, Vol. 6, No. 2, March/April 2003.

Financial Assistance for Renewable Energy Projects

STATE FINANCING PROGRAMS					
RURAL FINANCE AUTHORITY (RFA) AND MN DEPARTMENT OF AGRICULTURE					
<u>Requirements</u>	<u>Wind Energy Pilot Loan Program</u>	<u>Value Added Stock Loan</u>	<u>Agricultural Improvement Participation Loan</u>	<u>Manure Digester Loan Program</u>	<u>Sustainable Ag Loan Program</u>
Residence:	Minnesota only	Minnesota only	Minnesota only	Minnesota only	Minnesota only
Borrowing Entity:	Individual	Individual	Individual	Individual	Individual
Loan Purpose:	Wind Turbine	Wind Generation Facilities	Any Improvement to Real Estate	Alternative Energy Utilization	Wind Turbine
Loan Amount:	(RFA – 45%) \$500,000	45% Participation up to \$24,000	45% Participation up to \$125,000	\$250,000	\$25,000 - 7 yr.
Lending Entity:	Local Lenders (RFA Participation)	Local Lenders (RFA Participation)	Local Lenders (RFA Participation)	MN Dept. of Agriculture	MN Dept. of Agriculture
Security:	Real Estate	Stock Purchased Security Agreement	Real Estate	Negotiable	Negotiable
Interest rate:	1 st \$125,000 @ 6% Balance - @ 7%	4%	6%	0% through 6/30/03	6%
Amortization:	10 yr. on RFA Participation	8 yr. on RFA Participation	10 yr. on RFA Participation	10 yr.	7 yr.
Fees:	\$50. Application (Non Refundable)	\$50. Application (Non Refundable)	\$50. Application (Non Refundable)	No Fees	No Fees
Farm Full Time?	Yes	Yes	Yes	Yes	Yes
Equity Required:	Negotiable	Negotiable	Negotiable	Negotiable	Negotiable
Web Site:	www.mda.mn.us/agfinance	www.mda.mn.us/agfinance	www.mda.mn.us/agfinance	www.mda.mn.us/agfinance	www.mda.mn.us/agfinance

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Financial Assistance for Renewable Energy Projects

FEDERAL FINANCING PROGRAMS					
Agency:	Farm Service Agency (FSA)	Small Business Administration (SBA)	USDA RURAL DEVELOPMENT		
Program Requirements	Farm Ownership Guaranteed Loan	504 Certified Development Co.	Intermediary Re-lending Program	B and I Guaranteed Loans	Other Financing Considerations
Residency:	Minnesota only	Minnesota only	Minnesota only	Minnesota only	<p>USDA Rural Development has several other financing programs targeted at rural areas that may offer some opportunity under special circumstances. Most of these financial assistance programs involve a community based non-profit organization or a governmental agency as the coordinating lender. These programs are Rural Economic Development Loan and Grant, Rural Business Grant and B and I Direct Loan Programs.</p> <p>For further information on these programs, you can contact the web site listed below, or telephone: 651-602-7799.</p> <p>Commercial lenders are studying and researching their role in financing renewable energy projects, especially wind turbine installation, as a means of enhancing and promoting rural development. Long term production contracts that provide an excellent income stream are an important part of the criteria for their financial participation.</p>
Eligible Entity:	Individual, LLC or LLP	Community based certified development company	Non-profits or local government	Real estate, machinery and equipment, buildings	
Loan Purpose:	Real Estate	Community economic development; i.e.: wind turbine. Fixed assets.	Community development. Innovative projects, land, buildings.	Create and maintain employment and improve economic climate.	
Dollar Parameter:	\$731,000 OL & FO	\$1,300,000	\$2 million maximum/intermediary \$750,000 initially. Recipient - \$250,000.	Maximum \$25,000,000	
Lending Entity:	Local lender	Local lender - 50%. CDC - (jr. lien) - 40%. Borrower - 10%.	USDA to intermediary. Intermediary to recipient.	Banks, credit unions, insurance companies, Farm Credit Services, savings and loan associations.	
Security:	Real estate	Assets being financed. Personal guarantees.	Real or personal property of intermediary or recipient.	Lender decision	
Interest Rate:	Set by lender	Based on 5 and 10 year treasury issues	1% to intermediary Negotiable to recipient	Negotiated by lender	
Amortization:	Up to 40 years	10 to 20 years	30 year maximum	Lender negotiated	
Fees:	Yes	3% of the SBA debenture (Non Refundable)		2% of guarantee	
Equity Required:	Negotiable	10%	Negotiable	Negotiated by lender	
Other Criteria:		Job creation	Areas of under 25,000 people. Unable to obtain credit elsewhere.	Rural area. Population under 50,000.	
Web Site:	www.fsa.gov/pas/default.asp	www.sba.gov	www.usda.gov	www.usda.gov	www.usda.gov

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Selected Government Incentives for Renewable Energy in Minnesota – August 12, 2002

Type of Incentive	Incentive Provider	Description	Applicable Technology			Eligible Recipients	Effective Dates	Authority
			Biomass	Wind	Solar			
Incentive Payments	Federal	<p>Renewable Energy Production Incentive</p> <p>Annual incentive payment of 1.74¢ per kilowatt-hour (in 2002 dollars; payment is adjusted annually for inflation) for the first 10 years of operation, as annual appropriations permit. Solar, wind, closed-loop biomass, or geothermal facilities receive priority; any remaining funds may be used for payments to open-loop biomass facilities, including anaerobic digesters.</p> <p><i>US Department of Energy www.eren.doe.gov/power/rep.html</i></p>	x	x	x	Facilities owned by non-taxable entities such as state and local governments (e.g., municipal utilities) and non-profit electric cooperatives	For production started between Oct 1, 1993 & Sept 30, 2003	Code of Federal Regulations Citation: 10 CFR 451
	State	<p>Minnesota Renewable Energy Production Incentive</p> <p>A 1.5¢ per kilowatt-hour payment quarterly for up to the first 10 years of electricity generation from new on-farm anaerobic digesters and small-scale wind energy projects (2 MW or less, or 7 MW or less if owned by a cooperative with at least 51% local membership). The wind incentive is first-come first-served until a 100-MW statewide cap is reached. The payment rate is fixed.</p> <p><i>Minnesota Department of Commerce: Jeremy DeFiebre, 651-297-1221, jeremy.defiebre@state.mn.us</i></p>	x	x		Small-scale producers in the commercial, industrial, residential, non-profit, utility, and tribal council sectors, regardless of tax liability	<i>Digesters</i> — Jul 1, 2001 through Dec 31, 2015. <i>Wind</i> — for production started before Jan 1, 2005, until program is fully subscribed	Mn Statutes 2001: 216C.41
Income Tax Credits	Federal	<p>Renewable Electricity Production Tax Credit</p> <p>A tax credit of 1.5¢ per kilowatt-hour for the first 10 years of operation for electricity generated by wind, closed-loop biomass and poultry waste.</p> <p><i>Database of Incentives for Renewable Energy www.dsireusa.org</i> <i>IRS Form 8835 www.irs.gov/pub/irs-pdf/f8835.pdf</i></p>	x	x		Taxable corporate entities in the commercial and industrial sectors	Expires Dec 31, 2003	US Code Citation: 26 USC 45 (1994)
		<p>Solar & Geothermal Business Energy Tax Credit</p> <p>Tax credit equal to 10% of the purchase and installation cost of solar heating, solar electricity, or active geothermal energy equipment.</p> <p><i>Database of Incentives for Renewable Energy www.dsireusa.org</i> <i>IRS Form 3468 www.irs.gov/pub/irs-pdf/f3468.pdf</i></p>			x	Same as above	Ongoing, no expiration date	US Code Citation: 26 USC 48 (1994)
Accelerated Depreciation	Federal	<p>Accelerated Cost Recovery System</p> <p>Allows qualifying renewable energy systems to be depreciated using a double-declining balance, five-year depreciation schedule. Businesses should consult their tax attorneys for details.</p>	x	x	x	Taxable corporate entities in the commercial and industrial sectors	Expires Dec 2005 or as funds allow	US Code Citation: 26 USC 168 (1994)
	State	<p>Renewable Energy Equipment Accelerated Depreciation</p> <p>Same depreciation schedule as federal.</p>	x	x	x	Same as above	Ongoing	Mn Statutes 2001: 500.30 (5)

Type of Incentive	Incentive Provider	Description	Applicable Technology			Eligible Recipients	Effective Dates	Authority
			Biomass	Wind	Solar			
Property & Sales Tax Exemptions	State	Wind & Photovoltaic Property Tax Exemption Exemption from local property tax of the value added by small-scale (up to 2 MW) wind or photovoltaic energy projects. Partial exemptions apply for medium-scale (between 2 and 12 MW) and large-scale (more than 12 MW) systems. <i>American Wind Energy Association</i> www.awea.org/smallwind/minnesota_sw.html		x	x	Residential, commercial and utility sectors	For wind systems installed after Jan 1, 1991 & solar systems installed after Jan 1, 1992	Mn Statutes 2001: 272.02 (22), (24)
		Wind & Solar Energy Sales Tax Exemption State sales tax exemption for the full cost of wind energy equipment as well as materials used to manufacture, construct, install, repair or replace wind energy systems. Solar photovoltaic panels are also eligible if sold/purchased in Minnesota. <i>American Wind Energy Association</i> www.awea.org/smallwind/minnesota_sw.html		x	x	No restrictions	For solar panels sold/purchased before Aug 1, 2005. No deadline for wind facilities.	Mn Statutes 2001: 297A.68 (12) 297A.67 (29)
Rebates	State	Solar Electric Rebate Program Rebates of \$2,000 to \$8,000 for grid-connected solar-electric (photovoltaic) systems. <i>Minnesota Department of Commerce: Mike Taylor, 651-296-6830, mike.taylor@state.mn.us. Check for links in the future at www.commerce.state.mn.us/pages/Energy/MainModTech.htm.</i>			x	Xcel Energy customers in 2002 and 2003. Any Minnesota electricity customer in 2004 and 2005.	2002 to 2005, as funding permits	Mn Statutes 2001: 116C.779
Regulatory	State	Net Metering State statute requires utilities to purchase excess energy at retail rates from qualifying renewable energy and cogeneration facilities of 40 kW or less. <i>US Department of Energy www.eren.doe.gov/greenpower</i>	x	x	x	Investor-owned utilities, municipalities and rural cooperatives	Ongoing since 1983	Mn Statutes 2001: 261B.164 (3)
		Green Pricing State statute requires utilities to offer green power to their customers. Most programs so far involve premium pricing for wind energy, such as Moorhead Public Service's Capture the Wind program and Cooperative Power Association's Wellspring program. <i>US Department of Energy www.eren.doe.gov/greenpower</i>	x	x	x	Encourages development of renewable energy via premium pricing for customers	Ongoing, with goal of utilities obtaining 10% of the energy they supply from renewable sources by 2015	Mn Statutes 2001: 216B.1691

Sources of information in this table: Minnesota Department of Commerce www.commerce.state.mn.us/pages/Energy/ModTech/taxincentives.htm and correspondence with Mike Taylor; Database of State Incentives for Renewable Energy www.dsireusa.org; US Department of Energy, Energy Efficiency and Renewable Energy Network www.eren.doe.gov and Green Power Network www.eren.doe.gov/greenpower/home.shtml; American Wind Energy Association www.awea.org/smallwind/minnesota_sw.html.

