


Energy

Cost Share Programs & New Technology

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Energy: Cost Share Programs & New Technologies

Delmarva's Rising Energy Costs

Rising Delmarva Electric Rates

- DE Electric Co-op: 8 cents per kwh
- Delmarva Power: 65% increase (12-15 cents per kwh)
- Choptank Electric: 35% increase
- DPI's electric buying program has helped growers!

Electric Meter Information

Meter Number: E100003
 Current Meter Reading: Jul 15 (actual)
 Last Meter Reading: Jul 15 (actual)
 Your Utility Level: 4000

Your Most Recent Meter Reading is: Aug 15, 2004

Current charges for 12 days - Service Rates in Effect - Residential Service

Electric Delivery Charges

Customer Charge	\$	4.24
Distribution Charge: Fixed	500 kWh @ \$0.020000 Each kWh	\$ 10.00
Load	4000 kWh @ \$0.020000 Each kWh	\$ 80.00
Total Electric Delivery Charges		\$ 94.24

Service Charges

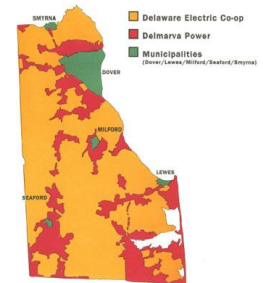
Transmission Charge	4000 kWh @ \$0.000000 Each kWh	\$ 0.00
Supply Charge: Fixed	500 kWh @ \$0.020000 Each kWh	\$ 10.00
Load	4000 kWh @ \$0.020000 Each kWh	\$ 80.00
Total Electric Supply Charges		\$ 90.00

Total Electric Charges

\$ 184.24

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Delaware's Electric Service



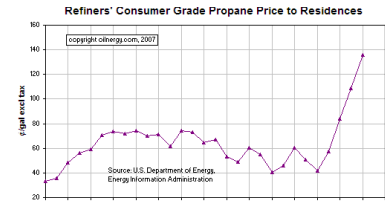
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Delmarva's Rising Energy Costs

Rising Delmarva Propane Rates

- Over \$1.50 per gallon last winter.
- NY Mercantile Exchange Futures Sept. 10, 2007 = \$1.27/gallon

Refiners' Consumer Grade Propane Price to Residences



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New Housing Incorporates Energy Efficient Equipment and Materials

- Growers with older poultry houses use significantly more electricity!
- Annual average electric use

 - Older housing: **309** kwh/1000 birds
 - New wide housing: **125** kwh/1000 birds
 - **60% LESS Electric !**
 - 121,000 birds x \$0.15/kwh x 5 flocks x 184 kwh/1000
 - **\$16,700 saved per year!!**

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New Housing Incorporates Energy Efficient Equipment and Materials

- Growers with older poultry houses use significantly more propane!
- Annual average propane use

 - Older housing: **43** gals/1000 birds
 - 6 to 10 yr old houses: **33** gals/1000 birds
 - New wide housing: **26** gals/1000 birds

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Older Growers Have Older Housing!

- Most growers realize investing in renovations and new equipment will lower energy use in older housing.
- Older growers, understandably, don't want to go into debt on their houses again!
- State and Federal cost share programs can help growers with older housing make energy saving investments in equipment and materials.



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What?? The Government Can Help?

- **U.S. Department of Agriculture**
 - Farm Bill: Section 9006
 - The Renewable Energy and Energy Efficiency Program
- **Delaware Energy Office (DENRC)**
 - Energy Answers for Businesses Program



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USDA Energy Programs

- **Who is eligible?**
 - Poultry Growers: Directly engaged in production of agricultural products receiving 50% + of their gross income from the operations.
- **Other requirements for eligible applicants:**
 - Must demonstrate financial need: submit latest tax return.
 - If individuals, must be U.S. citizens or legal permanent residents of the U.S.



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USDA Energy Programs

- **What program should be targeted?**
 - An **Energy Efficiency Grant**
 - Pays 25% of the project costs.
 - \$1,500 < Grant Request < \$250,000
 - Request of over \$50,000 requires an energy audit.
 - Need to show a 15% reduction in energy use to qualify.



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What Costs Can an Energy Efficiency Grant Cover?

A grant will cover 25% of the following:

- Post application purchase & installation of equipment (new, refurbished, or remanufactured).
- Post application construction or project improvements.
- Energy audits or assessments.
- Permit and license fees.
- Professional service fees, except for application preparation.
- Feasibility studies and technical reports.
- Business plans.



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How Do Growers Apply??

- Application submittal for 2008
 - Full details will be available in early '08 at: www.rurdev.usda.gov/rbs/farmbill/

In Delaware/Maryland, contact:

Bruce Weaver, USDA Rural Development
1221 College Park Drive, Suite 200
Dover, DE 19904
(302) 857-3625
bruce.weaver@de.usda.gov



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What Can We Do With Older Houses?

- Restore ceiling insulation: ~ 6 inches.
- Add thermal resistance (R-value).
 - Especially over brood chamber!
- Use batts instead of blown-in material.



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What Can We Do With Older Houses?

- Install energy efficient light bulbs.



5 Watt Cold Cathode

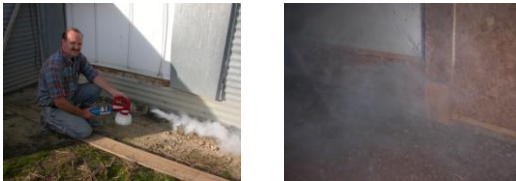
- Five flock electric use average
 - Prior to 5 W cold cathode: 309 kwh/1000
 - After installing 5 W bulbs: 226 kwh/1000
 - 27% decrease!
 - 121,000 birds x 83 kwh/1000 x \$0.15/kwh x 5 flocks = \$7530/yr!
 - Grower noticed a cooler panel box.



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Sealing the Sill/Foundation Crack



- Generate smoke near the foundation wall with fans operating.
- Notice the location and quantity of smoke entering near the floor!



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Sealing the Sill/Foundation Crack



Crack between wood sill and concrete foundation.

Filling crack with polyurethane foam.



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Sealing the Sill/Foundation Crack

- Beetles will eat foam insulation!
- Better solution: use CAULK



- Pneumatic caulk gun.
- Large sized tubes of caulk.



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Replace Older Fans with High Efficiency Fans



High Efficiency Cone Fans vs. Less Efficient (Box) Fans

Ventilation Efficiency Ratio = $\frac{\text{Air Flow Rate (cfm)}}{\text{watt electric into motor}}$



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High Efficiency Ventilation Fans

- **How Much Can Efficient Tunnel Fans Save in Energy?**
- Let's use a house (46 ft wide) with 32,000 birds and 11 – 48" diameter tunnel fans as an example.
 - 1 hp Box Fan: 16,500 cfm @ 0.08" static pressure, 965 W, VER = 17.0
or
 - 1 hp Cone Fan: 23,650 cfm @ 0.08" static pressure, 1150 W, VER = 20.6
- 11 Cone fans produce 707 feet per minute average air speed
11 Box fans produce 493 feet per minute average air speed
What does that do for production??
- It would take over 15 box fans to approach 700 feet per minute compared to 11 cone fans.
- 4 extra box fans each using 965 watts for 300 hours (each) operating during a warm month would cost \$180 (at 15 cents/kwh).



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What Else Can We Do?

- **Tunnel Boards:** Insulated boards covering the cooling pad.
- Act as a large vent box that distributes air so that dead air zones are reduced during tunnel ventilation.



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- I'll Be Glad to Help You!
- Call Me.

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New Technology



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- What's in the future
- Alternative sources of energy: solar, wind, geothermal, etc.
- University of Delaware has installed solar (photovoltaic, PV) panels to power a poultry house near Laurel, DE.



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What Does This Project Include ??

World Water & Power has installed two arrays of GE photovoltaic (PV) panels on an Allens company farm: The Portsville Farm

System cost: \$500,000 Capacity: 42 kW DC (65 kW AC)

Currently powering one poultry house: 42 ft x 320 ft



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Everyone asks

“What does this cost?”

“Will this ever be affordable?”

Consider the goals of this 3-year project

- To determine the **economics** of installing, operating, and maintaining solar panels as sources of power for poultry houses.
- To define and guide legislation that may be necessary to make this technology practical and viable.



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\$500,000! Why Is It So Expensive?

- This system has several components to allow multiple scenarios to be examined.
 - *Net-Metering*
 - *Demand Management*
 - *Battery Backup*



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Net-Metering



- This array generates power for the electrical distribution system.
- When the output by the PV system exceeds the power needed by the poultry house, the excess is sold to Delmarva Power (the meter turns “backwards”!).
- When the output by the PV system doesn’t meet the power needed by the poultry house, the balance of the power is supplied by Delmarva Power.



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Demand Reduction System (30 kW)



- **3 Key Components**
 - PV electric generation
 - Battery storage: increased during middle of day
 - Programmed limits on electricity used from Delmarva Power
- **Strategy: Cut demand charges by using PV electric to trim “peaks” of demand.**
- **Lower demand = fewer new power plants**



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Battery Backup System



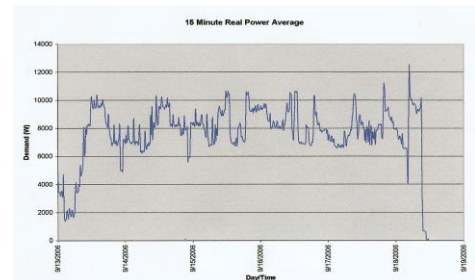
- 2 – Banks of 12 batteries
- Capacity: 108 kWh
- Tunnel fan uses 1 kW every hour it runs = 1 kWh
- Poultry house load can be carried for 8 hours off battery system
- Batteries play an important role in demand management.



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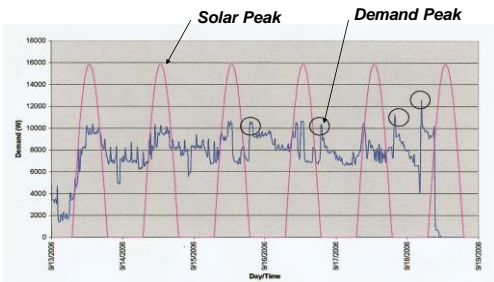
Electric Power Demand Over Time



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Cut Peaks of Demand Using Solar Power



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• How can we ever afford all this technology??

- Delaware Green Energy Fund: Pays for half the cost of equipment and installation.
- 30% Federal tax credit
- Accelerated depreciation
- Renewable energy credits (RECs, green tags, etc)
Tradable commodity
Current DE value = 20 cents/kWh
- System Life ~ 25 years
- Estimated system payback ~ 3-1/2 to 5 years



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• Any Questions?

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