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!

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

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!!

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
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.

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

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.

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.

How Do Growers Apply??

- Application submittal for 2008 ........
  - Full details will be available in early ‘08 at: [www.rurdev.usda.gov/rbs/farmbill/](http://www.rurdev.usda.gov/rbs/farmbill/)

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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.

What Can We Do With Older Houses?

- Install energy efficient light bulbs.

- 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.

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!

Sealing the Sill/Foundation Crack

Crack between wood sill and concrete foundation.
Filling crack with polyurethane foam.

Sealing the Sill/Foundation Crack

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

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

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}}
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
  - 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).

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.

I’ll Be Glad to Help You!
- Call Me.

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New Technology

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.

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
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.

$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

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.

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

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.
Cut Peaks of Demand Using Solar Power

Solar Peak
Demand Peak

• 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

• Any Questions?

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