Campaign: Gobbling Up Savings

What’s a CERTified campaign?
- Provide Minnesotans with clear, actionable ways to implement energy efficiency

How is CERTs helping?
- Sharing information about poultry-specific lighting
- Guiding farmers through multiple funding options

Goal: Help upgrade 20 barns to LED
Gobbling Up Savings

- #1 Turkey Producer in US
- 46 million turkeys raised (2012)
- 250 farmers, 600 farms
- Average 13 hours lighting each day (range of 5 to 24 hours depending on season)

Distribution and Density of Turkey Production
LED Lighting in Turkey Barns: CARD Grant Outcomes

- April 2011 – December 2013
- 12 farmers, 23 barns
- Incandescent and HPS bulbs:
  - 77-86% energy savings
  - 10,000 – 30,000 kWh/yr
  - $1,000 - $6,000 cost savings
  - 3 yr simple payback
- CFLs: is not cost-effective
- Total installation cost: $2,000 to $12,000 per barn
LED Lighting in Turkey Barns: CARD Grant Outcomes

- LED bulb costs keep declining
- LED dimming mimics sunrise/sunset
- LED lighting benefits to poultry
- Ample and even light for birds, low light level for barn staff
- No measureable poultry production decrease
- Also observed:
  - Improved feed conversion
  - Calmer birds
Why Upgrade to LEDs?

- Reduce lighting costs $1,000s each year
- Save up to 85% on lighting energy
- Pay for project with energy cost savings as soon as 1 year (3 yrs without utility rebates)
- Reduce maintenance time/cost
- Use poultry-specific lighting
  - Dimming, color, intensity
# Turkey Barn Lighting

## Bulb Type

<table>
<thead>
<tr>
<th>Bulb Type</th>
<th>Key Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High Pressure Sodium (HPS)</strong></td>
<td>• Ballasts’ energy use</td>
</tr>
<tr>
<td></td>
<td>• Each bulb provides a lot of light</td>
</tr>
<tr>
<td><strong>Incandescent</strong></td>
<td>• Dimmable</td>
</tr>
<tr>
<td></td>
<td>• Hi replacement rate</td>
</tr>
<tr>
<td></td>
<td>• Phasing out</td>
</tr>
<tr>
<td><strong>CFL</strong></td>
<td>• Poor dimmability</td>
</tr>
<tr>
<td></td>
<td>• Challenge to recycle in rural areas</td>
</tr>
<tr>
<td></td>
<td>• Mercury concerns</td>
</tr>
<tr>
<td><strong>LED</strong></td>
<td>• Dimmable</td>
</tr>
<tr>
<td></td>
<td>• Directional</td>
</tr>
<tr>
<td></td>
<td>• High installation cost</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bulb Type</th>
<th>Wattage</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPS</td>
<td>150W</td>
</tr>
<tr>
<td></td>
<td>250W</td>
</tr>
<tr>
<td></td>
<td>40W ballast</td>
</tr>
<tr>
<td>Incandescent</td>
<td>60W</td>
</tr>
<tr>
<td></td>
<td>75W</td>
</tr>
<tr>
<td></td>
<td>100W</td>
</tr>
<tr>
<td>CFL</td>
<td>13W</td>
</tr>
<tr>
<td></td>
<td>23W</td>
</tr>
<tr>
<td></td>
<td>26W</td>
</tr>
<tr>
<td></td>
<td>12W</td>
</tr>
</tbody>
</table>
LED Lighting in Turkey Barns: Campaign Design

Need:
- Lack upfront capital to make lighting retrofits possible

Goal:
- Help farmers navigate and bundle multiple funding options:
  - Utility rebates
  - REAP
  - NRCS EQIP
  - MDA

Image Credit: Tech Guru Daily
Electric Utility Rebate

- Rebates vary by utility. $$ per kW or kWh saved.
- Save the project’s invoice & send to utility
- Compatible with any other funding option
- Start project anytime

Get Started:
Call your electric utility
USDA NRCS EQIP Audit

- 100% of comprehensive audit
- Apply anytime
- Multiple application review cut-off dates per year
- Conduct audit after funding is approved

Get Started:
Visit local USDA office
http://offices.sc.egov.usda.gov/
USDA NRCS EQIP Project

- Cost-share audit-recommended energy efficiency projects
  - LED upgrades approx 35%
- Apply anytime
- Multiple application review cut-off dates per year
- Start project after funding is approved

Get Started:
1. EQIP or other qualified audit completed
2. Visit local USDA office, if no audit
USDA RD REAP

- Grants 25% of project costs
- Guaranteed Loans 75% of project costs
- Single applicant:
  1 Energy Efficiency Project
  1 Renewable Energy Project
- Applications due Apr 30
- Funding cycles *typically* 1/yr
- Start project after application is submitted

---

Get Started:
1. Workshop tomorrow
2. Get forms on website
MDA Livestock Investment Grant

- Grant 10% of project cost
- Min investment of $4,000
- Any improvements, including energy efficiency
- Funding cycle once per year, starting in the Fall
- Start project after funding is awarded

Get Started:
Review application

http://www.mda.state.mn.us/livestockinvestmentgrant
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAP</td>
<td>Conservation Activity Plan</td>
</tr>
<tr>
<td>EQIP</td>
<td>Environmental Quality Incentives Program</td>
</tr>
<tr>
<td>MDA</td>
<td>Minnesota Department of Agriculture</td>
</tr>
<tr>
<td>NRCS</td>
<td>Natural Resources Conservation Service</td>
</tr>
<tr>
<td>RD</td>
<td>Rural Development</td>
</tr>
<tr>
<td>REAP</td>
<td>Rural Energy for America Program</td>
</tr>
<tr>
<td>TSP</td>
<td>Technical Service Provider</td>
</tr>
<tr>
<td>USDA</td>
<td>U.S. Department of Agriculture</td>
</tr>
</tbody>
</table>
CERTs Resources

Website

www.mncerts.org/turkeys

Orientation of funding options, handouts, videos, project planning worksheets, and more!

Contact us!

Fritz Ebinger  |  febinger@mnproject.org  |  651-789-3330
Alexis Troschinetz  |  atroschi@umn.edu  |  612-626-0455

GET READY TO Gobble up SAVINGS!
Next Stops on Campaign Trail

Timeline:

- March 17-19 – Midwest Poultry Federation Convention
- June – Minnesota Turkey Growers Association Summer Conference

Outreach Partners:
USDA NRCS: You’ve got options

1. NRCS Audit
2. NRCS Audit
3. NRCS Audit

NRCS Audit → NRCS Assistance (NRCS Audit Required)
NRCS Audit → Any or No Assistance
NRCS Audit
LED Lighting Options

For Incandescent & CFL change outs:

- **CBM**
  - 15.5W
  - 50,000 hrs

- **Luma Vue**
  - 6.7W
  - 40,000 hrs

- **ONCE Innovations**
  - 12W
  - 35,000 hrs

- **NextGen Illumination**
  - 10W
  - 35,000 hrs
LED Lighting Options

For High Pressure Sodium change outs:

CBM
54W, replacing 150W

Trial Run:
Agricultural High Bays
Bird’s Eye View

**Human Eye Photopic Spectral Response**

**Domestic Fowl Photopic Spectral Response**

Relative Luminous Power - Natural Daylight at Noon

Relative Luminous Power - AgriShift® PLWR5000

Bird’s Eye View (Cont’d)
Turkey Barn Lighting (Cont’d)

<table>
<thead>
<tr>
<th>Bulbs</th>
<th>Life (hours)</th>
<th>Life (years)</th>
<th>Lumens/Watt</th>
<th>Power Consumption (watts)</th>
<th>Bulb Cost (each)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPS</td>
<td>24,000</td>
<td>5.6</td>
<td>100</td>
<td>150 + 40 (ballast) = 190</td>
<td>$14</td>
</tr>
<tr>
<td>Incandescent</td>
<td>1,000</td>
<td>0.23</td>
<td>15</td>
<td>100</td>
<td>$0.75</td>
</tr>
<tr>
<td>CFL</td>
<td>10,000</td>
<td>2.3</td>
<td>70</td>
<td>23</td>
<td>$3</td>
</tr>
<tr>
<td>LED</td>
<td>50,000</td>
<td>11.6</td>
<td>100</td>
<td>12</td>
<td>$35</td>
</tr>
</tbody>
</table>

- Annual Lighting Runtime: 2,000 – 7,500 hours per year, 4,300 hours on average
- Maintenance costs reduced when switching to more efficient lighting
## Study Results: Energy Savings

<table>
<thead>
<tr>
<th>Switch to LEDs from...</th>
<th>Number of Barns</th>
<th>Range of Energy Savings (%)</th>
<th>Average Energy Savings (%)</th>
<th>Average Energy Savings (kWh/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPS</td>
<td>4</td>
<td>76% - 79%</td>
<td>78%</td>
<td>32,500</td>
</tr>
<tr>
<td>HPS/Incan.</td>
<td>4</td>
<td>NA</td>
<td>77%</td>
<td>10,300</td>
</tr>
<tr>
<td>Incandescent</td>
<td>6</td>
<td>84% - 88%</td>
<td>86%</td>
<td>15,300</td>
</tr>
<tr>
<td>CFL</td>
<td>4</td>
<td>8% - 48%</td>
<td>34%</td>
<td>1,900</td>
</tr>
</tbody>
</table>

- Switching from incandescent and HPS bulbs result in the greatest savings.
### Study Results: Cost-Effectiveness

<table>
<thead>
<tr>
<th>Switch to LEDs from…</th>
<th>No. of Barns</th>
<th>Total LED Installation Cost ($)</th>
<th>Range of Energy Savings ($)</th>
<th>Range of Simple Payback (yrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPS</td>
<td>4</td>
<td>$9,200 - 12,200</td>
<td>$1,500 - 5,900</td>
<td>1.6 - 8.3</td>
</tr>
<tr>
<td>HPS/Incan.</td>
<td>4</td>
<td>$4,700</td>
<td>$1,100</td>
<td>4.2</td>
</tr>
<tr>
<td>Incandescent</td>
<td>6</td>
<td>$2,100 - 3,100</td>
<td>$1,300 - 3,000</td>
<td>1.0 - 2.1</td>
</tr>
<tr>
<td>CFL</td>
<td>4</td>
<td>$3,200 - 15,800</td>
<td>$150 - 260</td>
<td>No Payback</td>
</tr>
</tbody>
</table>

- LED bulb costs continue to decline
- Upgrade from CFL to LED is not cost effective
Homework: Video

KSMQ's "Farm Connections" Episode 602

Watch 30 min episode at: http://youtu.be/WwPx6NDq1CI
Watch 10 min version at: mncerts.org/turkeys

Featuring: Zimmerman’s LED upgrade