ENERGY CONSERVATION

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Basic Principles of Energy Efficiency and Conservation

- Appropriate design and sizing of systems
- Maintenance
- High performance equipment and structures
- Functional and efficient controls
- Record keeping
Energy Conservation Opportunities

- Field Operations
- Lighting
- Refrigeration
- Heating and Cooling
- Pumps and Motors
- Air Compressors
- Automated Controls
Field Operations

- Reduce number of operations
- Match implement to tractor size
- Speed
- Combine Field Operations
- Alternative Implements for Similar Operations
- Field Efficiency
- Depth of Tillage
- Crop Conditions
- Machine Condition
Lighting

✓ Use efficient fixtures (bulbs and ballasts).
✓ Use occupancy sensors and other intelligent controls.
✓ Design lighting for desired light levels.
✓ Maintain fixtures and lamps.
✓ Grow lighting:
  - Schedule for off-peak hours.
  - Stagger lighting schedules to minimize peak loads.
  - Arrange lights in accordance with manufacturer’s recommendations.
Heating and Cooling

- Insulate heated and cooled spaces.
- Use strip doors & dock seals where appropriate.
- Use high efficiency boilers, furnaces and cooling equipment.
- Maintain boilers, filters, steam systems, etc.
- Run heating and cooling systems only as needed.
- Use multiple appropriately sized units (boilers, compressors, etc.)
- Install radiant heat.
- Consider automated controls.
Pumps and motors

- Install high efficiency motors
- Use variable frequency drive (VFD) controls.
- Replace standard V-Belts with High-Efficiency belts.
Air Compressors

- Repair air leaks.
- Use large headers.
- Maintain minimum necessary pressure.
- Use synthetic lubricants.
Advantages of Automated Control Systems

- Data monitoring and trending
- Alarm capability
- Maintenance scheduling
- More complex control at all times
Renewables and Alternatives

✓ **Always improve efficiency first.**

✓ Check that any new source of energy is suited for your specific location and conditions.

✓ Understand the performance potential of renewable and alternative technologies without incentives.
RESOURCES

- NRCS Energy Self Assessment Tools
  (http://144.92.31.19)
- SARE – Clean Energy Farming
  (www.sare.org/publications/energy)
- Rutgers Cooperative Extension / NJAES
  (http://njaes.rutgers.edu/pubs - FS1068)
  (http://aesop.rutgers.edu/~horteng)
THANK YOU ...