# Greening Career Training

*By*

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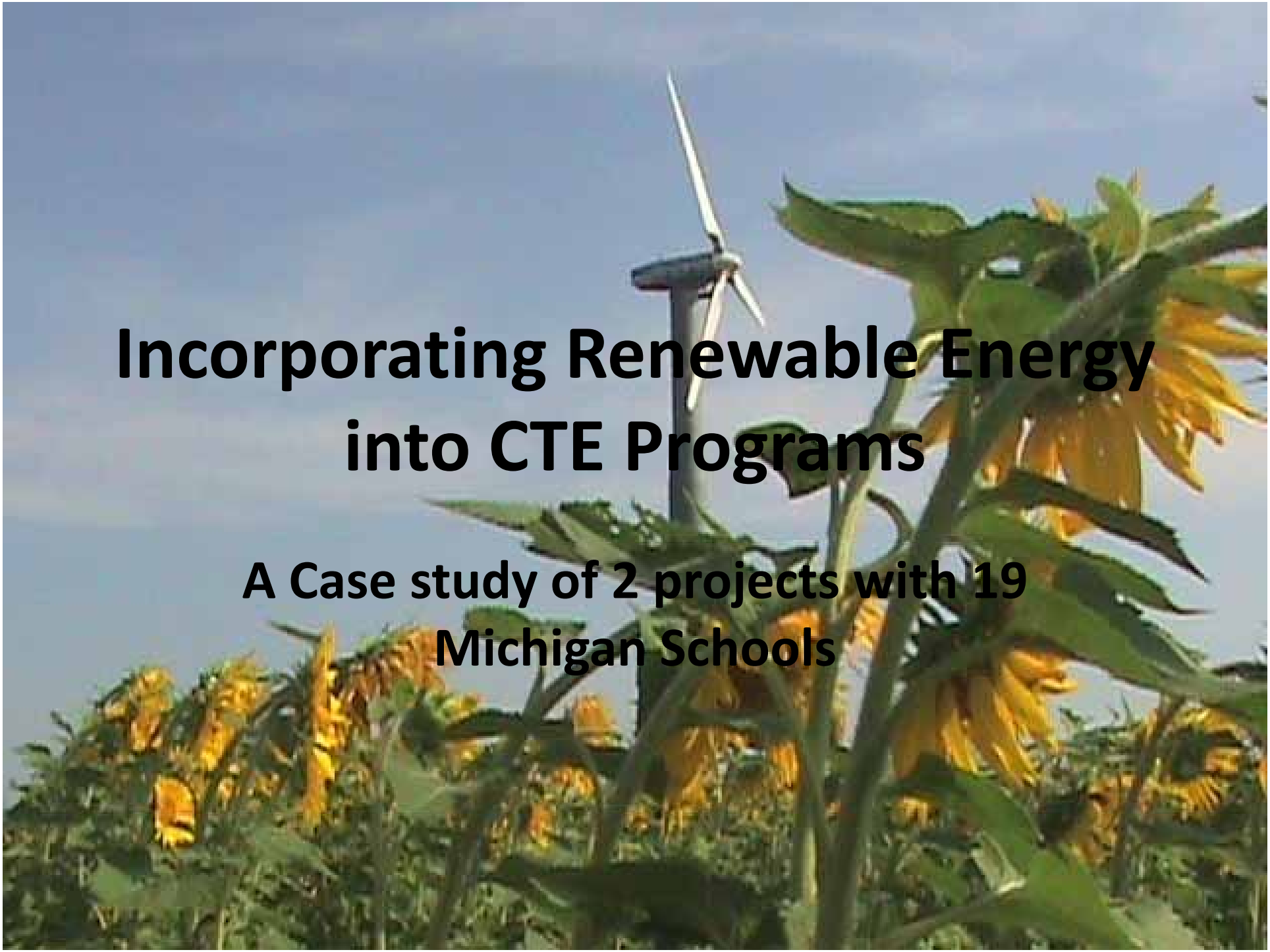
**Woodland Wind LLC**



# Incorporating Renewable Energy into CTE Programs

## A Case study of 2 projects with 19 Michigan Schools

# Project History…Laker Schools

- Started at Laker Schools in 2005
- K-12 Renewable Energy Education
- Wind, Solar, Bio Fuels (S and L), Weather, Recycling, EE, Conservation, Agricultural and Environmental Projects
- Community Outreach/Education, Demonstration and product launches
- $2.5 million to date

# Plus we have this in our Back yard!

# Moving into “Green CTE”

- Lakers only has an FFA CTE Program
- Our students attend HISD for other programs
- Brion and Kathy Dickens designed, wrote, and received funding for the Laker projects
- We started to work with 3 local ISD’s in 2008 and are currently assisting them to develop “Green” programs

# Identifying “Green Technologies”

- What are the most likely to create jobs
- What are the most viable in MI
- What work’s or shows the most promise in the future
- What can be taught
- This might be the most important

# The Technologies We Chose

**Green Technology**

- Wind Energy
- Solar Energy
- Bio Fuels (mass and Liquid)
- Energy Efficiency (Green Building)
- Conservation/Environmental

**Why it should/could be taught**

- MI has great wind/ new industry
- MI leads the world in Production
- Primarily Agricultural Based
- Fits well into existing Programs
- Also fits in well

# Let's look at wind……..

- MI is finally moving …
- 14th "windiest State"
- Record installations in the US
- Dozens of companies
- Future need for Technicians

- Future need for small wind installers

- This is great if……

- 140+ MW installed in the last 5 years (????)
- 35+ GW now installed
- Making turbines or parts
- One tech for every 6 turbines (avg.)
- Must be Licensed to install turbines for others

- Policy stays on track and the Utilities start supporting it more

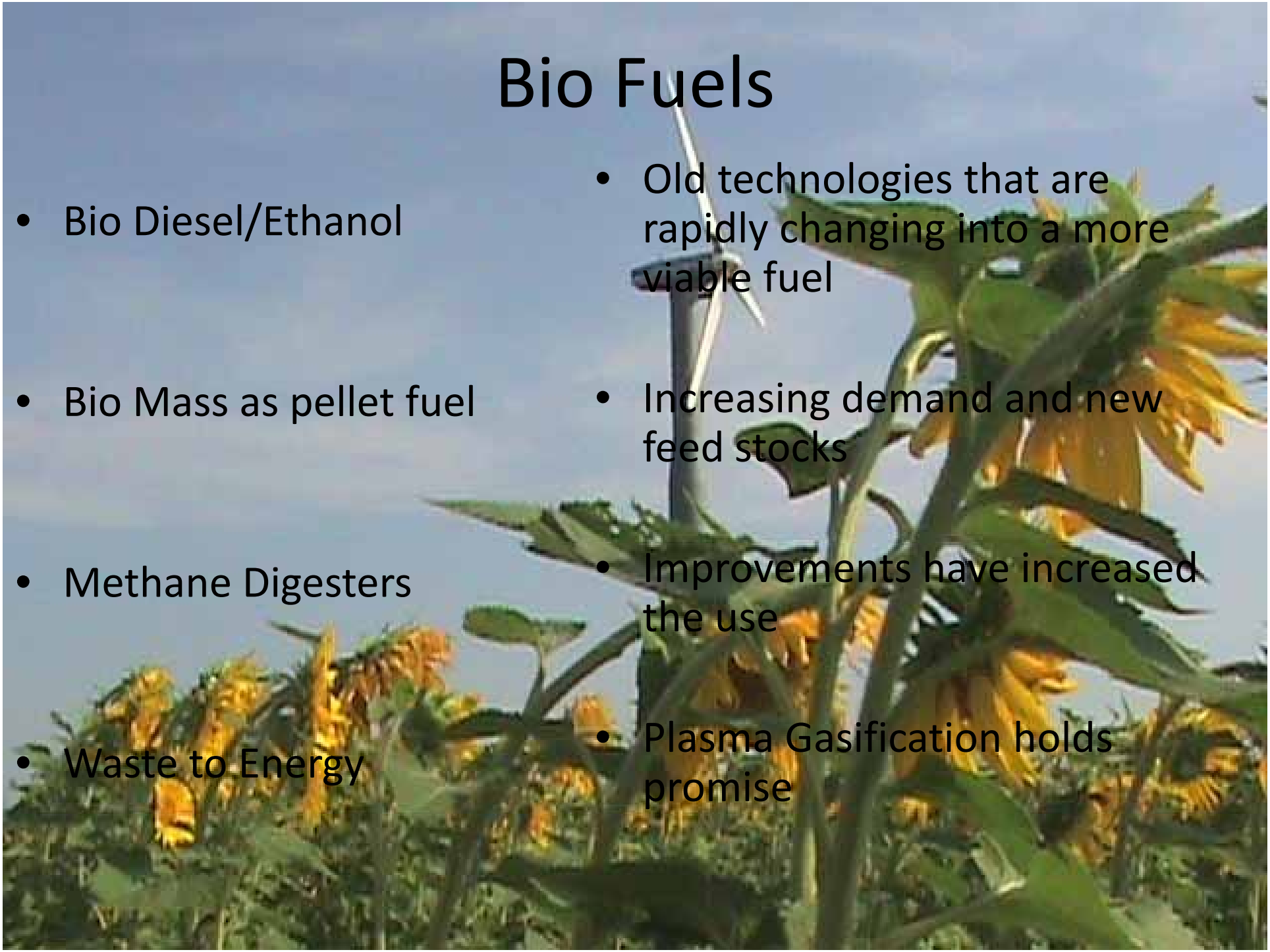
# Solar…

- MI makes the “stuff” in the solar panels and some panels
- We have “good sun” for PV
- Solar works where wind may not
- Need for trained installers
- Easy to incorporate into several programs
- We lead the world in fact
- Even for solar thermal
- Less issues than wind such as “zoning”
- Increasing demand
- Construction, Electrical, IT, Electronics, Ag., etc

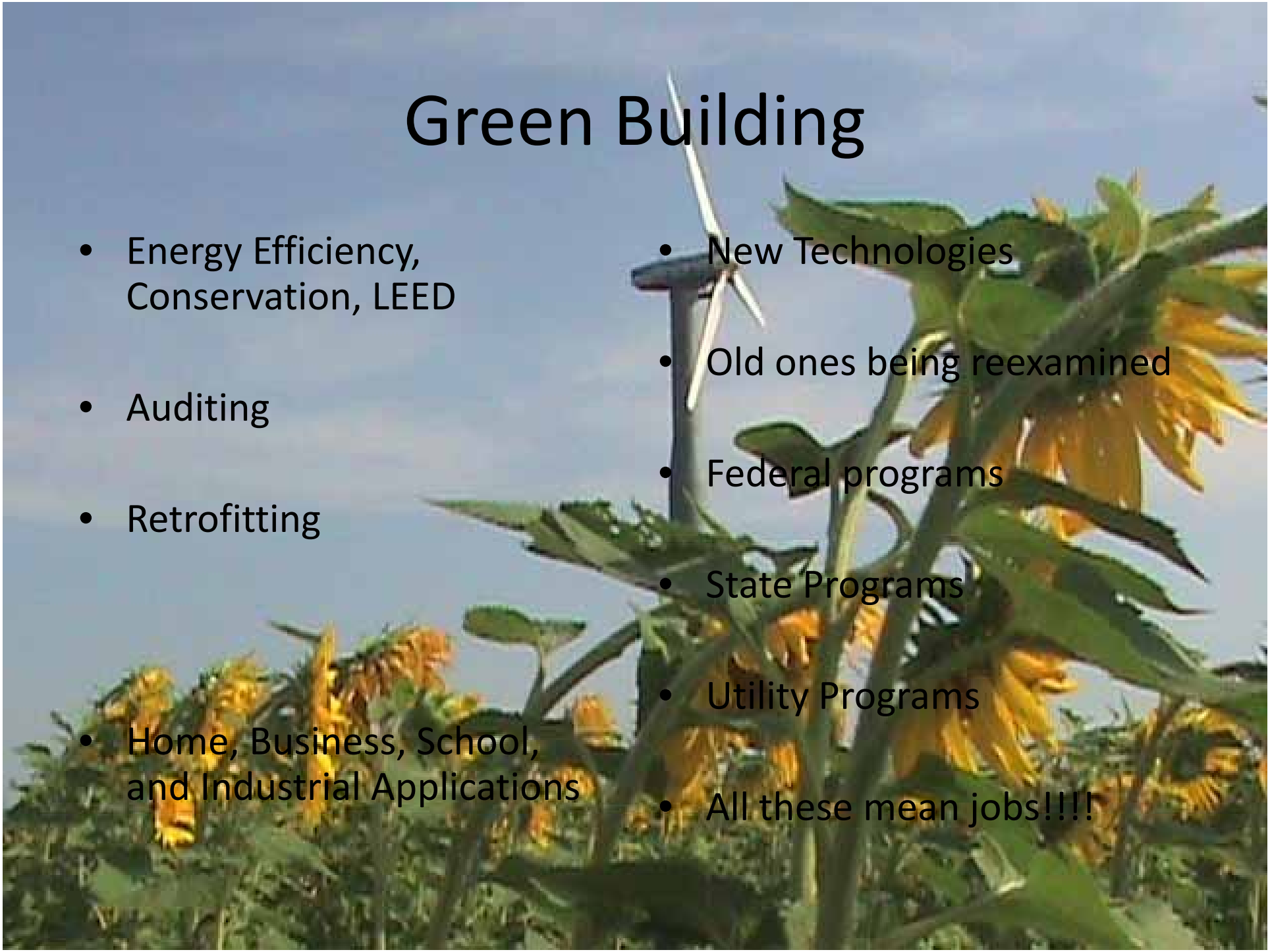
# Bio Fuels

- Bio Diesel/Ethanol
- Bio Mass as pellet fuel
- Methane Digesters
- Waste to Energy

- Old technologies that are rapidly changing into a more viable fuel
- Increasing demand and new feed stocks
- Improvements have increased the use
- Plasma Gasification holds promise



# Green Building



- Energy Efficiency, Conservation, LEED
- Auditing
- Retrofitting
- Home, Business, School, and Industrial Applications
- New Technologies
- Old ones being reexamined
- Federal programs
- State Programs
- Utility Programs
- All these mean jobs!!!!

# Agriculture

- Environmental topics
- Conservation
- Land Stewardship
- Horticulture/Crop science
- Organic Agriculture
- Also we can address…..
- Waste stream
- Animal/Human interaction
- Bio Fuel Crops

# Conservation/Environmental

- Environmental Awareness
- Energy Conservation
- Recycling
- Emerging Technologies
- These can be taught in every program

# What Equipment could be used?

**What we chose for this grant**

# Wind turbines

- All project schools receive the Skystream Turbine , the Bergey Turbine and their choice of one other MI Made Turbine
- Windspire, or Swift
- Plus a Davis Weather Station
- And, Internet Logging equipment

# Solar Array

- MI made product
- 690 watts with micro-inverter technology
- Web based monitoring

# Bio Diesel

- Bio Diesel Processer to make the fuel
- A Diesel Engine to burn it in
- Lab Equipment and text books to teach it
- Several Programs can learn with it and from it

# Bio Mass


# Technologies considered but….

- Fuel Cells
- Geo Thermal
- Solar Thermal
- Plant/Animal Sciences
- Methane Digesters

- Great technology just costly to teach with full scale equipment
- Hard to dig up a school lawn but may be highlighted with curriculum
- Another viable technology and we should have included it
- Limited accessibility at all Mi Schools
- ??????????

# Other key points to the Project

- Funding to build a “Green” building of the students design
- Funding for Energy Audits of the District and funding for EE upgrades chosen by the Students
- A Bio Diesel Vehicle Competition
- Website hosting, Community Outreach, more

# More Parts to the Project

**Training**

- All Staff using the equipment will be instructed as to its use and how to teach with it
- Networking between all partner schools will be developed to enhance this part of the Project

**Curriculum Support**

- Current “green” curriculum will be looked at for use in the project
- New curriculum will be developed
- All materials will be compiled into a complete Green Education Program for CTE in MI.

# Summer Training Workshop

**A Joint Venture Between Laker Schools and Kettering University**

**With support from several other Universities and Colleges in MI**

# Summer Workshop 7/19-7/23/10

**Michigan Energy Workshop**
**Kettering University and Laker School District**

| Day 1 | Day 2 | Day 3 | Day 4 | Day 5 |
|---|---|---|---|---|
| Introduction to Energy | WIND | Bio Fuels | Wind and Solar Hands-on | Material Development |
| Fuel Cells | Solar | Nuclear | Bio-Fuels Hands-on | Instructional Resource Review |

**University and Business Speakers**

**Vendor and School Exhibits**

# Summer Workshop

- Look for a communication in the next weeks
- Minimal fee/participant
- Training in use of equipment
- Educational training and hands on exercises
- Each participant will receive curriculum and items to teach it with (fuels cell cars, turbines, etc)
- Tours of Lakers and the Utility Scale Wind Farm
- Net woking with dozens and dozens of teachers that want to “teach green”

# Again, that's 7/19-7/23/10

**Look for the information**

**Or**

**Contact me at woodland@airadvantage.net**
**and I'll put you on the contact list**