

# Emerging Agrivoltaic Applications for Midwest Farms



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**Putting solar panels and traditional farming activities in the same place**

**Allows farmers to harvest the sun twice!!**

**AGRIVOLTAICS**



# Common Examples

**Pollinator habitat**



**Growing vegetables**



**Sheep Grazing**



# Reduce Fossil Fuel Use in AG

## WCROC Research

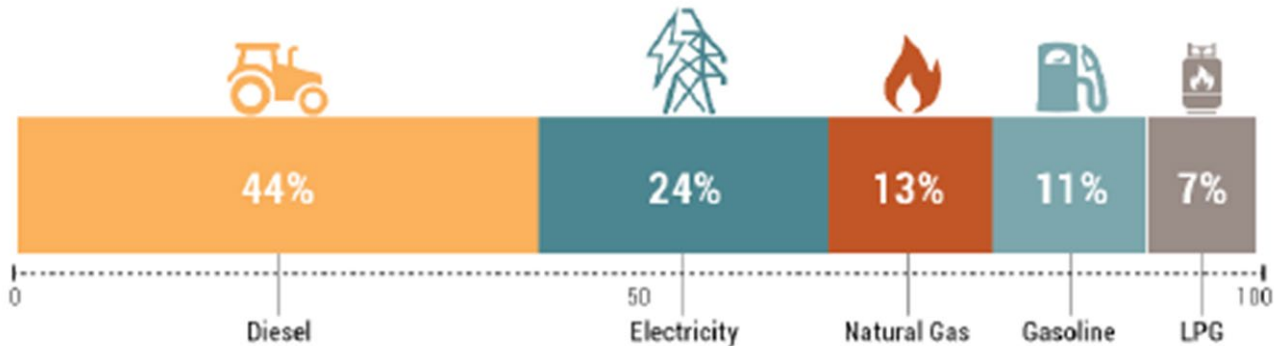
### Strategic Farm Electrification

- Direct energy consumption
- Chemicals

### Agrivoltaics

### Alternative fuels

- **Green hydrogen and ammonia**  
Fertilizer, tractor fuel, grain drying, power generation





# Emerging Agrivoltaics

- **Weed Terminator**
  - Autonomous robot to weed row crops - Roomba® for a corn field!
  - GPS navigation and on-board cameras to help steer and identify corn/weeds
  - Weeds controlled mechanically – organic friendly
  - Battery powered, recharged with solar charging station



# Emerging Agrivoltaics

- **Solar Charging Trailer**

- 14' cargo trailer outfitted with:

- 3.3 kW solar mounted on slides
- 15 kWh LiFePo batteries
- 6 kW inverter
- Level 2 EV charger

Future plans:

Add an 8 kW H<sub>2</sub> fuel cell





# Emerging Agrivoltaics

- **Mobile Solar Shade/Power Station**

- Cows like shade, but grazing cows move
- Mobile solar shade platform is designed for 25 cows with 18 kW of bifacial panels
- Power station is off-grid using batteries to store electricity
- Designed to fold up so it can be pulled to different pastures (fit through gate)
- Pulled by electric tractor and stored energy will charge tractor
  - Other potential power uses in pasture like irrigation



# Emerging Agrivoltaics

## Solar in corn fields?



A group of MN farmers have designed a mounting system for putting a solar array in a traditional corn/soybean field.

- We will monitor environmental conditions
- Viability always comes down to cost and interconnection



# Other Agrivoltaic Projects??

- **Single axis tracking array in cow pastures**
  - Optimizing cow management to reduce array costs
- **Green hydrogen and ammonia**
  - Can be made with solar energy
  - Reduce carbon footprint of corn production by ~90%
- **Optimizing field operations for row crop production**





# Thank You



**Eric Buchanan**  
**Renewable Energy Program**



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