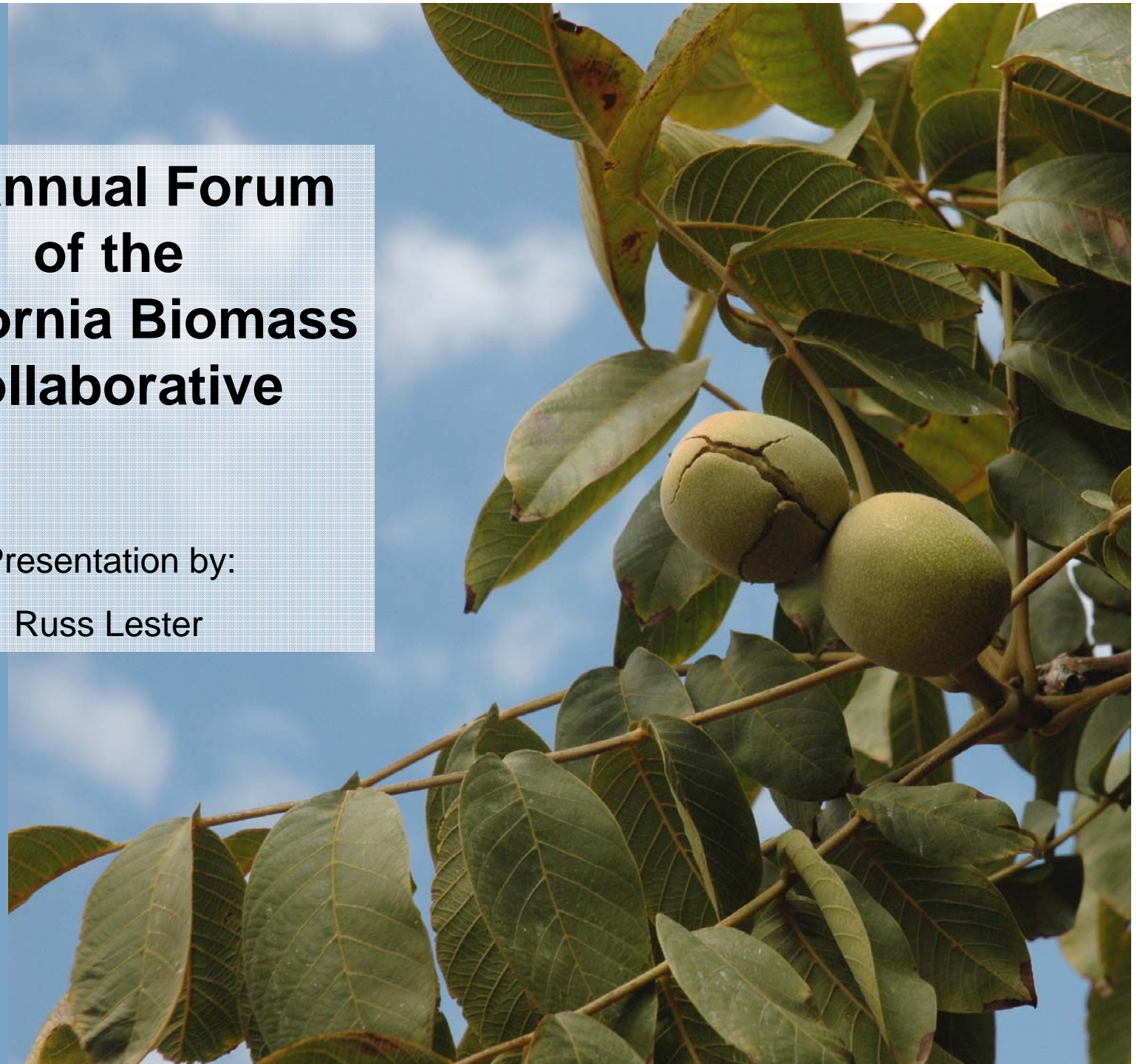


# **6<sup>th</sup> Annual Forum of the California Biomass Collaborative**

Presentation by:  
Russ Lester





# Dixon Ridge Farms

- ❑ **Grower and Processor of Organic Walnuts;**
  - The largest handler of organic walnuts in the United States;
  - We grow organic walnuts on over 500 acres, and buy about 2,500 more acres of organic walnut production from 67 growers
  
- ❑ **Family farming in California since 1867 and organic since 1990;**
  
- ❑ **We follow a sustainable, whole systems approach to organic farming and business.**



# Our Energy Goal

***Total farm and processing net energy self sufficiency by 2012 for all types of energy***

We aim to achieve this goal while taking into account:

1. Carbon neutral or negative
2. Nitrous-oxide neutral or negative
3. Use non-food sources for energy
4. Energy costs should be reasonable
5. Transferable



# Current Conservation Practices

## 1. Recycle

- Hulls/shells – spread back into orchard
- Water – recirculation systems since 1982
- Prunings – chipped and back into soil since 1976
- Aluminum/paper/plastic/steel/etc - as much as can

## 2. No till / Mow production methods since 1980

## 3. Integrated Pest Management

## 4. Fertilize with Compost, rather than synthetic fertilizers

## 5. Irrigation – New type

- Overhead hoses - through tree branches
- Drop rotary sprinklers – greenhouse style
- Compatible with cover crops/organic production
- VFD Electric Pump Motors
- Operate at 20-25 PSI at pump vs. 40-50 PSI for drip and micro-sprinklers

## 6. Freezer insulation - all at or above R 70 even though “normal” is R 45

## 7. Dryer Improvements

- Recirculation cover - tent/ building
- Save 35-40% of drying fuel
- Same number of dryers, trailers and drying capacity

## 8. Land conservation / preservation





ORGANICALLY GROWN WALNUTS

# Current “Green” Energy Production

## 1. Solar

- **3,500 square feet of PV panels**
- **Generates \$3,500/year of electricity**
- **Very low maintenance**
- **Specifications on all new buildings include loading for solar panels of 6#/sq. ft**
- **Future desire to increase to over 90,000 sq. ft**
- **Side benefit of cooling by shading roof with panels**
- **Solar addition is a perfect fit with freezer energy use**



## Current “Green” Energy Production (cont.)

2. **Bio Max 50** – Manufactured by Community Power Corp (CPC), Grant from CA Energy Commission (CEC)

- **Production**

- **Propane:** Offsets \$12-14,000/year during 5-week drying season
- **Electricity:** Produces \$30-45,000/year
- **Hot Water:** Hydronic
- **Heating:** Use hydronic or hot air to heat our buildings & dryers
- **Local Use:** Will use 100% of produced energy on site
- **Fuel:** Uses about 820,000 pounds of walnut shell per year

- **Environmental Impact**

- **Walnut shells:** Are a renewable, non-food, source of energy
- **Waste:** Hope is to use “char-ash” in compost and apply back into orchard (long-term carbon sequestration)
- **Net negative release of carbon:** 1,000 year half-life in soil
- **Carbon Cycle:** CO<sub>2</sub> produced will be reabsorbed by trees to produce walnuts, which provide food and more shells for energy production that will be used to dry and process walnuts



# Status Report

## ❑ Energy Generation and Reduction

- Generate about 20% of our electricity use
  - Offset about 40% of our propane use
  - Reduce dryer heat needs by about 70% via CHP and recirculation
- ➔ Total is about 25% of all energy used

## ❑ Costs

- Produce about \$40,000/year of electricity
  - Offset about \$14,000/year of propane
- ➔ Cost to produce electricity and propane onsite is about the same as retail price



# Future Projects (Grants Please!)

- ❑ **More solar panels on the roofs – possibly up to 90,000 sq ft**
- ❑ **CPC Liquid Fuel Module, 2008 trials, 2009 production**
  - Will generate approximately 25 gallons/day, 15,000 gallons/year of synthetic diesel
- ❑ **Change gas generator to a diesel generator, 2009**
  - 85% producer gas, 15% diesel type fuel (diesel, synthetic-diesel, bio-diesel or vegetable oil)
  - 100 kW of electrical production
- ❑ **CPC Bio Max 100, late 2009**
- ❑ **CPC Hydrogen Module, ?**
  - Possibly use for fuel cell energy for forklifts, vehicles, electricity generation
- ❑ **Walnut shells burned for hot air to be used for walnut drying and building heat, Fall 2009**
- ❑ **Walnut Oil, 2009**
  - Press inedible walnuts into oil for biodiesel or walnut oil fuel
  - Estimated 12-14,000 gallons could be produced per year under current production
  - Would supply 75% of current diesel needed for tractors, irrigation, trucks and generators
  - Estimated cost of \$1.25/gallon
- ❑ **Absorption chiller on freezer**
  - Should save about \$18,000/year
- ❑ **Research Studies**
  - Carbon and Nitrogen – UCD/NRCS
  - Char ash use – CPC/UCD
  - Energy efficiency improvements – UCD Energy Efficiency Center, PG&E
  - Energy production – UCD/CA Biomass Collaborative ?

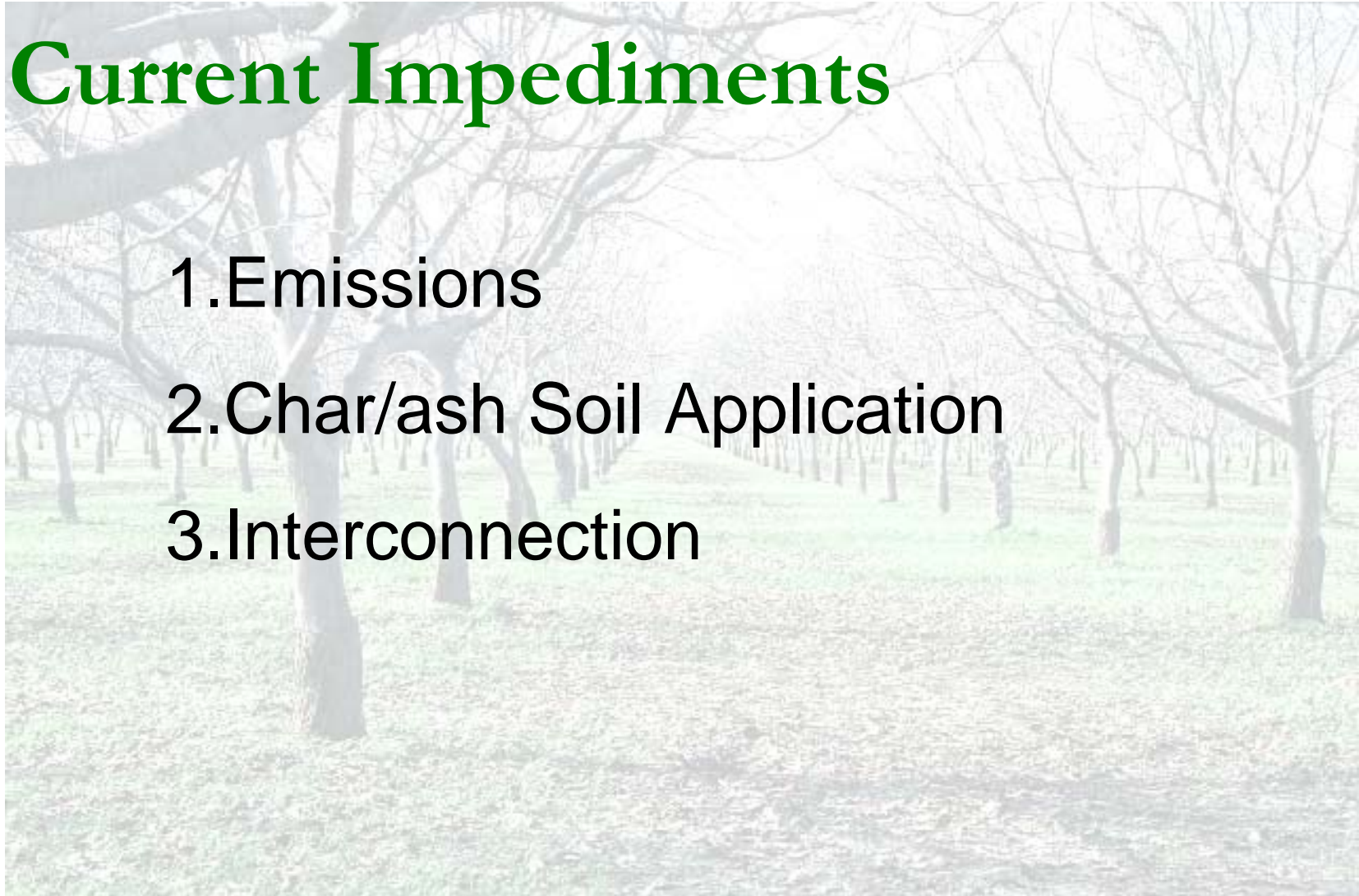




ORGANICALLY GROWN WALNUTS

# Current Impediments

1. Emissions
2. Char/ash Soil Application
3. Interconnection





# Impediment 1: Emissions

- Letter of non-compliance
- Time to issue Authorization to Construct (ATC) est. 3 years
- Length of time to issue Authorization to Operate (ATO) - 9 months
- Costs – about \$12,000 so far



## Impediment 2: Char-ash Application

- We face potential oversight from the following agencies:
  - USDA, NRCS, US EPA, CA EPA, Yolo and Solano County Dept. of Ag and Dept. of Health, CIWMB, CA OSHA, US OSHA, WRCB, CCOF, USDA, DFG
  - Others?
- Good news – CARB grant to UCD to study soil application



# Impediment 3: Interconnection

- ❑ Catch 22
  - Solar net meter for four renewables only; not biomass
    - Could have used Non-export, but equipment was about \$50,000
    - Would never have been able to pay this off
  - FIT prohibits interconnection with solar NEM that took incentive money or CEC PIER grants
- ❑ Fees for FIT
  - Game stopper for small renewable generators
  - Was told as high as \$50,000, may actually be less, confusion
- ❑ FIT MPR is not high enough to pay for costs
- ❑ MPR - natural gas based, subsidized and variable. Falling prices=falling interest in RPG





# Global Issues

- ❑ Overcoming Centralized Power and Distribution thinking
- ❑ Security – centralized power plants and transmission is less secure
- ❑ Not all renewable power is green or how it can be made black
  - TANC –
    - Description – 600 miles from NE CA to 15 MOUs, mostly Bay Area
    - Will destroy 60,000 acres of forest, farm and range land, permanently
    - Total solar array is about 22,000 acres
    - 650 square feet on each house served
    - Cost of \$1.5 - \$6 Billion
    - Could give each house \$1000-\$4000
  - Large solar in desert areas destroys a fragile environment, maintenance?
  - Algae ponds in the desert consume large quantities of water, destroy the environment and are not sustainable
- ❑ Transport of Bio Mass to centralized plants, not sustainable, cost-effective.



# Solutions

- Encourage small, distributed, renewable fueled generation.
- Renewable fuels information clearinghouse, advocate, etc. needed
- One stop permitting - emissions, interconnection, by-products, etc.
- Simplified, fast and consistent method to rectify problems



# Solutions, cont.

## Emissions

- Need to be based on fuel life cycle calculations
- Phased in for renewable power
- Should not be regional standards/goals –expand zones, coordinate
  - If they are emitted in another district, they still are emissions
- Need to balance – Looking just at NOX gives only a partial view



# Solutions, cont.

## Interconnection

- ❑ Rule 21/net meter and AB 1969/FIT need to become one. Why?
  - **Simplify.** Would be better able to understand and promote.
  - **Eliminate conflicts** between the two programs.
  - **Simplify integration** of new renewable technologies.
  - **Administration** of AB 32, AB 1969/FIT, RPS and RPG goals would be simplified.
  - **Accommodate change.** RGFs (Renewable Generation Facility) would not have to understand and decide which is best for their needs now and in the future.
  - **Accommodate import/export change.** It is hard for RGFs to balance loads and generation. The hybrid would make this unimportant. Grid stability and capacity would be increased.
  - **Fully develop RPG.** Existing Net Meter limits generation to annual on-site use.
  - **Encourage Conservation.** RGFs would conserve energy because they would not make “use-it-or-lose-it” decisions.
  - **Simplify Tariffs.** The number and type of tariffs would be simplified.





# Conclusion

- Stimulate short and long-term economy and job gains. Move the USA and CA energy sector toward domestic self-sufficiency.
- Encourage maximum energy conservation and efficiency.
- Expedite adoption of Renewable Power Generation (RPG).
- Meet the goals of AB 32, RPS and AB 1969/FIT.
- Embrace Distributed Generation (DG) as a highly desirable method of meeting local energy loads without incurring the high environmental and economic costs of high voltage grid transmission and centralized generation.
- Diversification of fuel types for RPG is good, stabilizing the market, power generation and costs.
- Overshooting the goals of RPS, AB 32 and AB 1969/FIT is better than under achieving them.
- These solutions should be implemented immediately
- **THESE GOALS CAN BE MET; AGRICULTURE CAN PLAY A ROLE**

