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This Way to Sustainability Conference II

*Helping Communities
Embrace Clean Energy*

Funding Sustainable Agriculture

CSU Chico

November 3 2006

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Stephen Miller, SEI



Thor Bailey, Ag Biomass Council

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Who Are We?

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Embrace Clean Energy



Strategic Energy Innovations...

- Non profit established in 1997
- **Empowers underserved markets**
 - such as schools and universities
 - small & rural communities
 - affordable housing developers/managersaccomplish their green building & clean energy goals.

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SEI's Higher Education Programs

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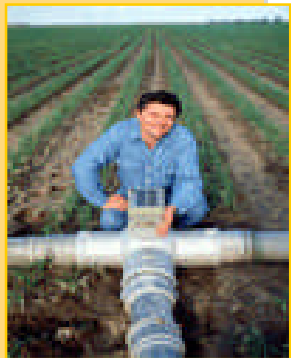


- **Awareness for Communities about Energy (ACE):** Students conducting energy audits & related energy education
- **Green Campus Program:** Student interns promoting energy efficient technologies and conservation practices across primary areas on campus: housing, dining and facilities
- **Green Residence Hall Demonstrations:** Design, technical & marketing assistance in support of on-campus showcases of green lifestyle and energy efficient products

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California's Central Valley

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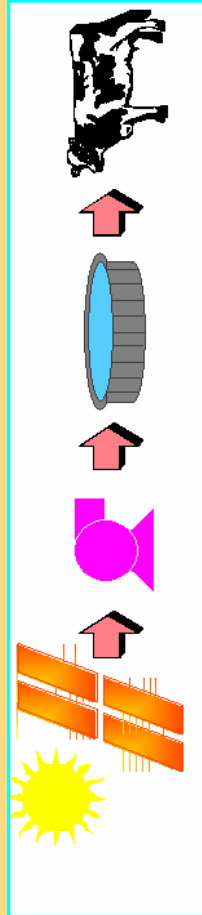


- California's Central Valley (CV) is known for its extraordinary abundant and varied agriculture, having a reputation for being the most productive agricultural area in the world.
 - The CV is home to nearly half of the state's farmland and almost 75% of the irrigated land.
 - Its warm climate & intense irrigation allow the production of several crops not seen in other parts of the country: rice, almonds, figs, kiwifruit, nectarines, olives and walnuts.
 - Nine of the nation's top ten agricultural producing counties are in the Central Valley, including Fresno, Tulare, Kern, Merced, San Joaquin, and Stanislaus.

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California's Central Valley (Contd.)

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- California is also the largest **food-processing** employer in the country, shipping \$50 billion worth of food products annually.
 - The state's fruit and vegetable processing is centered in the San Joaquin and Sacramento Valleys.
- The Central Valley is experiencing the **fastest rate of population growth** in the state.
 - The CV has the second **worst air-quality** in the nation.
- Agriculture is **highly dependent on electricity** for irrigation and post-harvest processing.
 - Ag is the 3rd largest industry consumer of electricity in California.
- The State and the EPA have recently placed **new air & water quality standards** in play that press farmers to invest in & maintain low-emissions technologies on their properties.

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AG BIOMASS COUNCIL



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- Core group of Central Valley Farmers, Sustainable Farming Advocates and Developers focused on technical and financial support for ***small- to medium-sized biomass projects!***
- Converting waste biomass to value add products is an environmental mitigation & resource conservation opportunity, requiring socially responsible investments for modest returns!
- Infrastructure & trained employee pool to support rural projects does not exist!

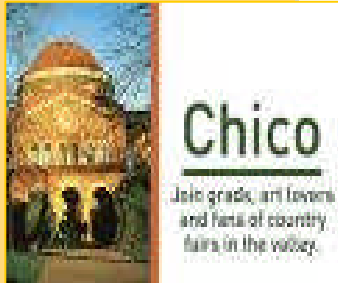
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AG BIOMASS COUNCIL



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ABC & CALIFORNIA HIGHER EDUCATION



R&D & Training: CSU Chico • Butte College

Green Credits: Green Capital Network

Technical Partners: *Ag Biomass Alliance*

Applied Biomass Technology, Ag TEaM Solutions,
California Biofuels, Western Energy Systems,
Dairy Resource Group

Policy & Market Strategy:

UC Merced

Great Valley Center

Strategic Enterprise Development Group (SEDG)



FEEDSTOCK MANAGEMENT



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- **Type:** Determine need and optimum technology conversion system for maximum economic return from products produced.
- **Sources:** Orchard removal & pruning • fruit pits • urban & industrial wood waste • lot clearing brush • leaves & grass clippings • food processing waste • equestrian straw • cattle, hog, chicken manure
- **Location:** Minimizing transportation is critical.
- **Availability:** Long term source & contracts required.
- **Financing:** Hard to find because of variables, low yield return.

LANGERWERF DAIRY



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- Leo & Linda Langerwerf in Durham - owners.
- Digester was installed in 1982, one of the first in California and still operating today.
- Plug flow digester converts manure from 350 cows into biogas (methane). Runs engine/generator that produces 75 kwh of electricity & hot water heat for home and milking facility.
- Soil Amendment left over from digester sold locally, water retained in pond and used for irrigation on the Langerwerf Farm.

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LANGERWERF DAIRY



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GREEN WASTE DIGESTERS



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- Converts any organic waste material into methane gas for heat & electric energy use, while producing a weed free soil amendment by-product!
- ONSITE POWER SYSTEMS INC - Davis
(web site): www.onsitepowersystems.com
- PRO PACIFIC & RANCHO ESQUON - Durham
Proposed AADS may use local food & green waste diverted from land fill in addition to other agriculture sources: rice straw, manure & spoiled products.
Joint Venture: ABT Inc. & Bio-methane LLC

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GASIFICATION



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GREEN CAPITAL NETWORK – Fresno

- Proposed Gussing gasification system producing 7 megawatts of electricity and thermal energy for production of 50 million gallons of ethanol annually.
- Only one is operating in Austria & this may be the first of this design in California.
- Project was proposed based on the need for local farmers alternative to field burning of orchard pruning estimated to be 50,000 + acres.
- Targeted to displace purchase of fossil fuel (natural gas) and create green credits.

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Wood Chips to Heat, Power & Biofuels

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Gussing Community Power plant as result of economic necessity & realization to do something creative and constructive with woody biomass in the area.

CALIFORNIA BIOFUELS LLC



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- Group of 8 local fruit growers intend to develop integrated cannery residues management program through sugar based ethanol production.
- Proposed facility being planned south of Oroville for an integrated closed loop farm energy system.
- Proposed integrated system technologies may include, ethanol, gasification, bio-diesel, compost.
- Products will be produced for California Biofuels members and surplus sold to local farmers.

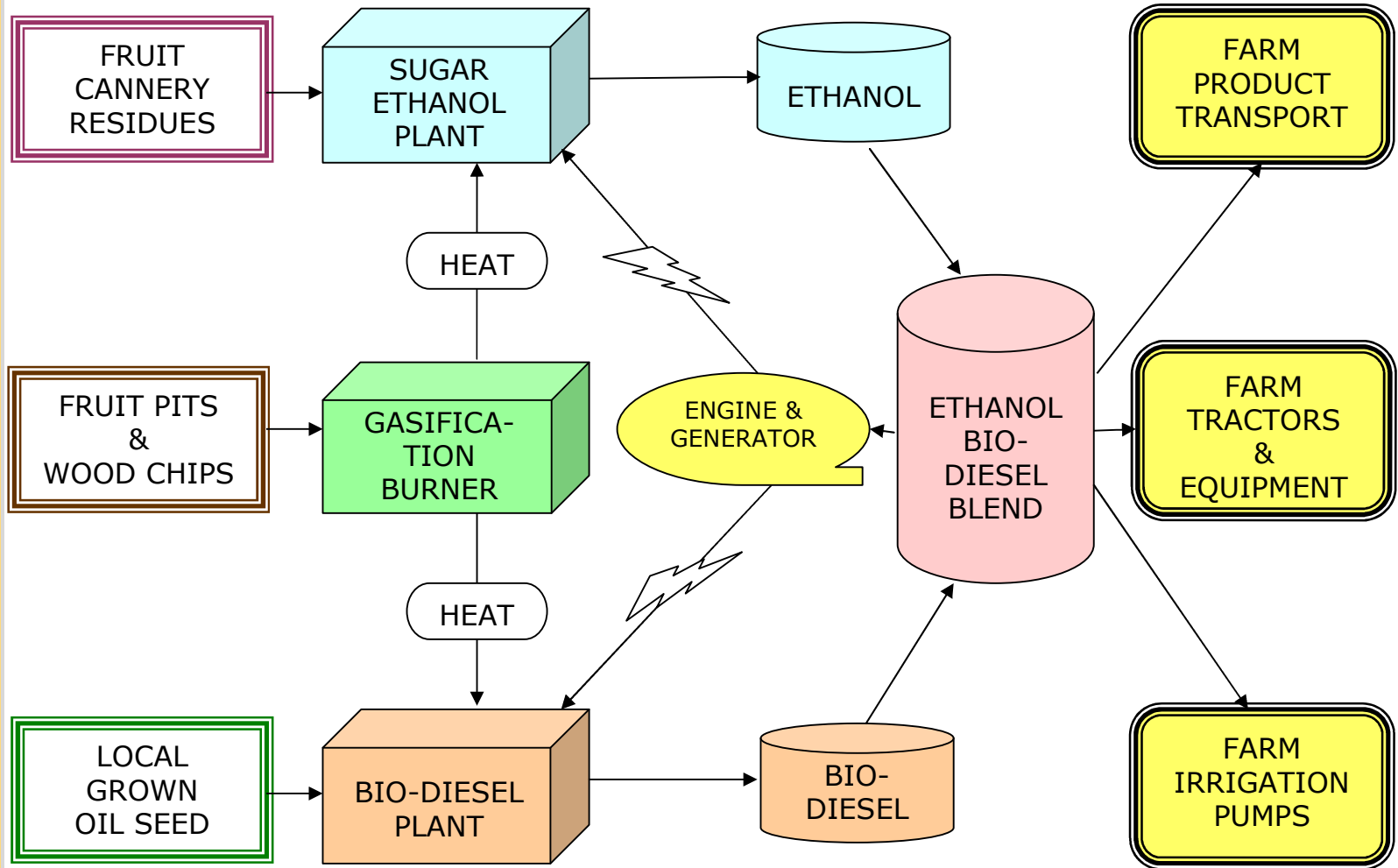
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ENERGY FARM SCENARIO



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PROPOSED INTEGRATED BIOMASS CONVERSION SYSTEM



CURRENT STRATEGIES & NEXT STEPS



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INFORMING A NEW DIRECTION!

- Educate California legislators regarding the financial disparity between rural & urban biomass systems!
- Bridge the funding gap between farm produced energy & utility/investor driven energy systems!
- Tap transfer of farm land for housing & commercial development to create funding for small projects!
- Help our members develop a new generation of qualified farm friendly biomass technology, engineers, and project managers for facilities!

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Thank You!

*Helping Communities
Embrace Clean Energy*

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