Arizona Waste-to-Energy Workshop

Renewable Energy from Biomass 10/24/07

Minutes

Welcome Remarks

Workshop moderator, Maggie Witt US EPA thanked the Environmental Protection Agency (EPA), the Arizona Department of Agriculture (ADA), XL Renewable for making the workshop possible.

Ms. Witt reviewed the workshop agenda, list of workshop participants, informational packet, and directed that the index cards were for questions to be asked after each session. Ms. Witt introduced each panel prior to the presentations:

ADA Director Don Butler, welcomed and thanked the group and for attending the workshop, and emphasized that renewable energy is a sign of the times.

Elizabeth Adams US EPA Deputy Director of Superfund thanked the ADA Agricultural Consultation and Training (ACT) group, XL Renewable, Maggie Witt US EPA, Representative Harry Mitchell's office, the House Committee of Natural Resources and Public Safety. This workshop is about good productive conversation and exchanging ideas to create a renewable energy facility in Arizona where agricultural waste can be used to make energy.

Jim Klinker Executive Secretary of the Arizona Farm Bureau Federation, thanked the group for allowing him to speak, and stated that agriculture is evolving and is now more productive. There are now healthier animals and farms look to add value to their products which are often organic, natural and free range. There are many opportunities to be explored.

Hassayampa Landfill Overview

Martin Zeleznik of the US EPA discussed the detailed history of how the Hassayampa Landfill became a superfund site in western Maricopa County. The site can be located by using Google maps. In 1979-1980 there was flooding along the Salt River. The Salt River clean up efforts contaminated the Hasssayampa Landfill with 3.2 million gallons of waste, making it toxic and categorized as a National priority and a superfund site in 1989. In 1992 local

groundwater changes affected the clean up efforts. The EPA is looking to use local agricultural wastes such as poultry litter, and dairy manure to assist in running the electrical clean up equipment a the Hassayampa Landfill.

Q: What types of toxic waste are at the Hassayampa Landfill?

A: Mainly Volatile Organic Compounds (VOCs) are found at the Landfill. A listing can be found on the EPA superfund website: http://www.epa.gov/superfund/sites/npl/nar902.htm

Q: Time frame for cleaning up site, and taking manure?

A. Quickly as possible. This workshop is for major exploration and conversation about using agricultural wastes as a renewable energy option.

Waste-to-Energy 101

Dan Moring, Arizona Department of Environmental Quality (ADEQ) discussed the basics of methane digesters and gasifiers. Mr. Moring's presentation was on the science and technology of converting organics to gas for electricity and heat production. Anaerobic digestion is better for wet residues, must be sized correctly, and it is a living system that needs proper attention and upkeep which allows faster digestion at higher temperatures. There are three types of anaerobic digesters: Covered lagoon, complete mix, and plug-flow. Gasification is best suited for dry residues and is applicable for almost any biomass product. The types of gasifiers vary by pressure value, combustion location, and air/steam/oxygen input location, combined heat and power (thermal and electrical recovery) which increases efficiency. The feedstock attributes vary widely and there is a need to add energy to get energy from the gasification system. The system components for both anaerobic digestion and gasification are: Manure Collection, pretreatment, digester vessel, biogas recovery system, biogas clean-up, biogas handling and use equipment.

Q: Is there web-access for the presentation?

A: Materials will be posted on EPA website after the meeting. AgStar is a good resource for information: http://www.epa.gov/agstar/resources/press.html

Q: What major environmental issues does ADEQ have?

A: Water quality permits, air quality permit for gasifiers, bio-systems vary so the permits and state requirements will too.

Q: Will excess energy provided by these systems be put back into the grid?

A: Interconnection power purchase agreement with local utilities. There will be a presentation on that later today.

Q: What type of turbine will work with 200-500 BTU/cubic foot?

A: I am not sure, but do know about a flex turbine out of California that works on as low as 100 BTU.

Break a fifteen minute break with refreshments was provided by XL Renewables INC, Vicksburg, AZ

Energy Programs in Arizona and the Western Region

Gayle Gordon, Director, Western Regional Biomass Energy Program, Western Governor's Association (WGA) presented information about local energy programs. Ms. Gordon represents 19 western governors that meet on common issues such as natural resources and the environment. Western Governors are looking for clean diverse energy and transportation fuels for the future. Arizona's Governor Napolitano has taken the lead for biomass initiatives. Biomass feedstock generates fuel, power and heat. The (WGA) wants to add 30,000 mega watts of clean energy by 2015, and increase energy efficiency. This can be accomplished with the right policy in place. There is information on the web about the WGA issues that they are looking at: http://www.westgov.org/ such as creating stable fuel supply that can be connected to the consumer, pricing and energy is used locally. There are air quality issues, reduction of wildfires, promotion of healthy forests, and healthy watersheds where landfills are used less, and the production of methane, and carbon dioxide are reduced.

Q: Does the WGA take into consideration the issue of moving agriculture into biomass production instead of food, where food costs go up?

A: Agriculture decisions are up to the producer fuel vs. food is a bigger picture globally. Food vs. fiber is an issue too.

Robin Boudreau, Community Energy Program Manager, Arizona Department of Commerce's (ADC) mission is to promote energy conservation and efficiency

and reduce energy demand by developing and implementing comprehensive state energy conservation plans supported by Federal financial and technical assistance. The Department develops materials promoting renewable energy incentives in Arizona and facilitates lectures, workshops and presentations for government agencies including state, cities, towns, counties and tribes to Arizona a State known for production and use of alternate fuels and reduce vehicle emissions, including greenhouse gases, encourage and promote fuel diversification to enhance air quality.

Q: Is there a program at ADC for businesses to start up with this type of energy?

A: There is not a program at this time. There has been only one audit this year on energy efficiency for renewable energy.

Q: Ag support for ag waste efficiency in the Buckeye area?

A: Yes, there is support for development, individuals should go through the city and embrace energy and concepts.

Ed Hermes, Program Information Office, Legislative Liaison, ADA, the department promotes renewable energy and encourage producers to diversify their portfolio. ADA has conservation based programs such as the Livestock and Crop Conservation Grant Program (LCCGP) that promotes renewable technology like solar panels for remote rangeland wells. We have programs for outreach to educate producers about different grant programs and opportunities.

Q: Where are the tax incentives in Arizona for energy production?

A: There are enough incentives out there that cover taxable costs educational and functional technical outreach is also available.

A: NRCD mentioned a brochure with grant contact information, and outreach opportunities. People can participate in local NRCD meetings on a regular basis for assistance.

Utilities' role in Waste-to-Energy

Tim McDonald, Senior Power Technologies Engineer, Arizona Public Service (APS) There are project considerations and constraints when establishing a bio-fuel facility such as the project size – individual vs. community, the site, design, permits, product(s), electrical interconnect and pricing, permits, water, emissions,

traffic, waste cost, hauling, handling, cleaning, storage, drying, chipping, operation and maintenance costs, and crew. APS recommendations are "community-scale" facility with "individual" site waste prep for hauling and conversion, co-op business and multi-collaboration technology mix driven by wastes, maximize product and revenue options, co-firing at large plants, production of pipeline quality bioMethane, pyrolysis products - chemicals, fuels & biochar (Air, Water and CO2).

Rex Stulting, Manager of Interconnection Development, APS discussed the process of interconnecting a generator into the power grid. The public with help from a consultant can request for interconnection through APS or other privately owned utility company, there are study agreements as well as supplemental interconnection and operating agreements that go along with the interconnection request.

Leonard Gold, Manager, Utility Strategies Consulting Group discussed the Ak Chin Energy Services biomass feasibility study and experience funded by the Department of Energy (DOE). Ak Chin utility services with Ak Chin Farms, Hickman Egg Ranch and the Ak Chin tribal community worked on the generation of electricity from ag waste and transmission of the energy and interconnecting it to consumers as well as distributing leftover material on the farm as soil additive.

Highlights of the proposed project:

Current	**Proposed**
Truck hauls raw chicken litter to fields	Tanker truck or pipeline used to deliver liquid fertilizer to fields
Truck spreads raw chicken litter on fields	Tanker truck or pipeline transfers liquid fertilizer from tanker to feeder tractor and liquid fertilizer inject below soil
Tractor disks raw chicken litter into soil	Tractor disks soil
Nutrient content of raw chicken litter varies from barn to barn	Nutrient content of liquid fertilizer is homogenous

litter varies from barn to barn	is homogenous
	Reduction of nitrogen loss

Q: Does APS regulation provide a certain amount that they pay a provider?

A: Prices are market driven. APS weighs proposals, and type of proposals.

Q: Would the Ak-chin proposed project produce pipeline quality methane?

A: Yes, it is possible in the Pinal study. Pipeline quality methane is already produced at similar facilities in Texas, Washington, and Europe.

Q: Plans to accept biogas into the grid?

A: Yes, there would be a separate pipeline built.

Q: Do you know anything about the biomass facility in Snowflake?

A: 8 miles west of Snowflake, AZ there is a 22 mega watt biomass facility. This facility is outside the Abitibi Paper Mill and it uses paper sludge from mill and forest clean up after the Rodeo-Chedeski forest fire.

Q: Where do power purchasing agreements fit in?

A: Transmission is totally different than power purchasing contact Barbara Lockwood at APS Manager, Renewable Energy (602) 250-3361 barbara.lockwood@aps.com

Lunch an hour and half working lunch provided by XL Renewables INC, Vicksburg, AZ, and presentations were made by Bed Cloud, President, and Dennis Cordeman, Chairman of XL Renewables INC. The XL facility in Vicksburg, AZ projects efficiency by combining a dairy operation with a biofuels plant and fractionation mill to produce renewable biofuels, quality animal feeds, and milk products. The energy efficiency ratio of 10:1 is the highest of any biorefinery project in existence today which means that for every 1 btu of fossil fuel (for growing corn and transportation) XL produces 10 btu's of renewable energy. XL has also developed a system to get energy from algae.

Q: What happens to the corn husks?

A: They are left in Iowa. Maybe cellulostic is in XL's future.

Q: Where does the water come from for the algae production?

A: Waste water is only used.

Q: Does the movement of food/grain into fuel cause food shortages?

A: Food grade corn has the best chance in the market. Less than 16% of corn is used for food the rest is staying here for ethanol. Prices delay ethanol plants from growing and we need to stabilize the market based on the value of oil.

Q: Address claims in the press about ethanol subsidies?

A: Outrageous subsidies, rapid growth push gas out of the way. Algae are part of the future.

Siting Biomass Projects

Penny McDaniel US EPA, Office of Solid Waste and Emergency Response Energy consumption in the U.S. is estimated to increase by 40% increase by 2025. Energy Breakdown used today (2005) 87% fossil fuels 6% nuclear 6% hydroelectric1.4% renewable energy (geothermal, wind, solar, biomass) energy consumption will increase approximately 33% and 49%, respectively by 2030. To meet increasing energy demand, hundreds of new power generation facilities will need to be constructed, including renewable energies. EPA national strategies are clean energy and climate change priorities are energy efficiency, energy production and supply, manufacturing and industrial processes, transportation and fuels. There is also effort to clean up contaminated lands in the US, there are over 40,000 sites for screening and over 7 million acres of land those lands are located on the National Priority List (NPL) sites – a.k.a. Superfund sites. There is continued collaboration out there, and regularly scheduled meetings to have a forum for solutions, and to keep in touch.

Dennis Lindsey, Real Estate Manager, Maricopa County, there are 10 landfills in the County. The Board of Supervisors is responsible for the taxpayer interest on how a landfill can be used. There are statutory requirements on how a landfill can be utilized.

Matt Holm, Maricopa County, Planning and Development, talked about development patterns in western Maricopa County, and that it is growing. Maps of the growth patterns in Maricopa County were evaluated.

Q and A for panel:

Q: Are there green wastes in the 10 landfills in Maricopa County?

A: There are closed landfills and landfills in the County have transfer stations.

Q: Is there USDA funding or DOE funding for projects?

A: There are credits and incentives, loans, grants. There is not much out here this is up and coming, eventually there will be more opportunities now and in the future.

Q: Where can you find grant information?

A: www.grants.gov http://www.dsireusa.org/ are online information resources.

Q: What landfills have gas collection?

A: Cave Creek has gas collection.

Q: What went into the project for Buckeye growth?

A: Trends of development into west Maricopa County was in the 2000 economic land available patterns.

Grants and Funding for Waste-to-Energy Projects

Kevin Stein, USDA, NRCS discussed the Conservation Innovation Grants (CIG) in the 2002 Farm Bill. This program is a voluntary competitive grant program and intended in the Federal investment in environmental enhancement and production, in conjunction with agricultural production. Under CIG the Environmental Quality Incentives Program (EQIP) funds are used to award grants to non-governmental organizations, Tribes, or individuals proving more options for environmental enhancement and compliance with Federal, State, and local regulations. CIG projects may be watershed-based, regional, multi-State, or national in scope. There is additional information on the web at www.nrcs.usda.gov/programs/cig

Sherman Reed, USDA, NRCS reviewed the Environmental Quality Incentives Program (EQIP) is a voluntary program with continuous sign-up, that provides assistance to farmers and ranchers who face threats to soil, water, air, and related natural resources on their land. The lands that are eligible are on which agricultural commodities or livestock are produced. This includes: cropland; rangeland, and grassland, pasture land, private, non-industrial forestland, and, other land determined to pose a serious threat to soil, air, water, or related

resources. EQIP is a competitive program. Applicant's conservation plans are ranked to establish which applications will achieve the highest environmental benefits and be selected for contract development. There are certain criteria, and guidelines that applicants must follow to apply for EQIP monies. Information can be found on the Arizona NRCS Website: www.az.nrcs.usda.gov/programs/
Final EQIP rule can be found at: www.nrcs.usda.gov/programs/eqip
Allan Watt, USDA Rural Development, The Farm Security and Rural discussed the Investment Act of 2002 (the Farm Bill) created a number of programs for rural America including a direct and guaranteed loan and grant program to help fund renewable energy systems and energy efficiency improvement projects in rural America.
The Farm Bill established the *Renewable Energy Systems and Energy Efficiency Improvements Program* under Title IX, Section 9006. This section directs the Secretary of Agriculture to make loans, loan guarantees, and grants to farmers, ranchers and rural small businesses to purchase renewable energy systems and make energy efficiency improvements. Congress provided $23 million to fund the program in each of fiscal years 2003 and 2004. Pursuant to the Farm Bill, eligible applicants include farmers, ranchers and rural small businesses. To be eligible for grants, applicant must demonstrate financial need as determined by USDA.
Eligible renewable energy projects include systems that generate energy from wind, solar, biomass, or geothermal source or that produce hydrogen derived from biomass or water using a renewable energy source. Renewable energy projects can include the generation of electricity, heat, fuels, or hydrogen. Energy efficiency improvement projects are also eligible. Energy efficiency projects typically involve installing or upgrading equipment that results in a significant reduction in energy use from current operations.
The Energy Title of the Farm Bill includes a few important definitions – what is renewable energy and what is meant by the term "biomass." According to the law, Renewable Energy: energy derived from: wind, solar, biomass, or geothermal source, or hydrogen derived from biomass or water using one of the

above energy sources. Biomass: any organic material that is available on a renewable or recurring basis. Includes: agricultural crops, trees grown for energy production, wood waste and wood residues, plants (including aquatic plants and grasses) residues, fibers, animal wastes and other waste materials, and fats, oils and greases (including those that are recycled). The term "biomass" does not include paper that is commonly recycled or non-segregated solid waste. This has been interpreted by USDA to mean that landfill gas and inorganic materials (such as tires) are not eligible.

Closing and Adjourn

Elizabeth Adams US EPA Deputy Director of Superfund Clean-up made the closing remarks and was excited to see what groups were present at the workshop to share information; she thanked the group for the various topics and the open communication at the workshop and questioned what will be next step? EPA will make a commitment to get the Waste-to-Energy information out, and put into the EPA web site. Workshop participant contact information will be available for networking. ADA ACT Coordinator for Agricultural Conservation Education program reminded the group ACT is non-regulatory and will attempt to compile a web based list of waste to energy resources. There is potential to keep the Waste-to-Energy dialogue going, and have this group meet regularly.