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SECOPA 2011
Waste to Energy Options for Local Governments

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Outline of Presentation
Waste to Energy Technologies

- Waste to alternative transportation fuels
- Waste to biopower
- Examples of projects/Companies-forefront
- Benefits – energy independence, less greenhouse gases financial benefits – operating/capital
- What's needed – FLIP – Feedstock, Land, Interconnect, Power purchase agreement
- How to galvanize support – Tennessee Renewable Energy & Economic Dev. Council (TREEDC)/

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Waste to Energy Technologies Available for local governments

- **Technology : <u>Municipal Wastes to Biodiesel</u>**
- **Process – Collect waste vegetable cooking oil from restaurants/households and mix to produce biodiesel-**
- **Companies: Biodiesel Logic builds a 55 gal/250 gal processors - produce 2 batches of biodiesel per day. Processors range from $60 K to $100 K.**
- **Local Governments: Hoover AL produces 30,000 gal a year at less than 1.00 per gallon. Other cities - Gadsden, AL, Crossville, TN, Kokomo, IN**
- **Benefits – diversion of grease from wastewater which reduces clogged lines and saves on overtime cost – co-prod.– glycerin – car soap. – emergency supplies**

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Waste to Energy Technologies Available for local governments

- **Technology** : Municipal Wastes to Green Diesel
- **Process** – wastes are sorted and microwaved into a synthetic drop in diesel – no emissions
- **Companies**: 49 Green: 30 K tons biomass to 2.4 million gal. of green diesel
- **Local Governments**: none yet – firm works out of Jackson, MO and is seeking patent from Denmark.
- **Benefits** – wastes are diverted from landfill saving on capital dollars for expansion

Waste to Energy Technologies Available for local governments

- **Technology** : Municipal Wastes to Ethanol
- **Process** – wastes are gasified using a thermochemical process to create syngas and bacteria is injected to ferment gas into ethanol.
- **Companies**: Coskata,, Enerekem, Fulcrum, Ineos, Powers Energy
- **Local Governments**: construction in Indian River County, FL Lake County, Indiana- pending,. McCarran, Nevada – Fulcrum – 90K to 10.5 mil gal- 2012
- **Benefits** – wastes are diverted from landfill saving on capital dollars for expansion, cheap feedstock to produce ethanol

Waste to Energy Technologies Available for local governments

- **Technology** : Agriculture/Municipal Wastes to Ethanol
- **Process** – crop wastes/wood residues/switchgrass – enzymes are used to break down sugars from lignin– yeasts are added to slurry of sugars to ferment into alcohol.
- **Companies**: Dupont Danisco, Poet
- **Local Governments**: pilot plant in Vonore, TN, Scotland, South Dakota
- **Benefits** – wastes are diverted from landfill saving on capital dollars for expansion, low costs of feedstocks to produce ethanol

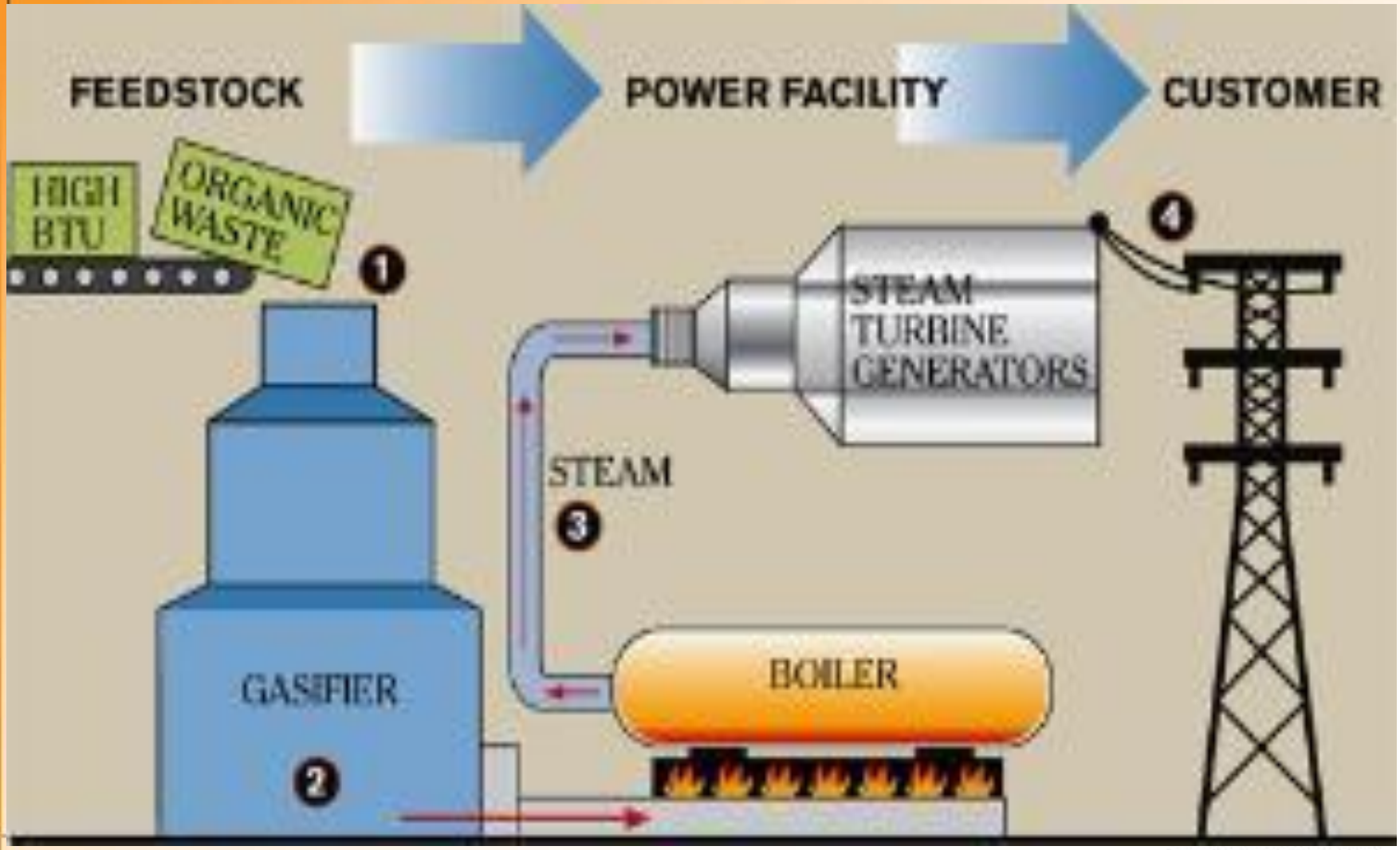
Wastes to biopower-

- **Co products from Ethanol production**
- **Anaerobic Digesters: Turning waste into power.**
  Lignin from the enzymatic hydrolysis process will go to the anaerobic digesters to produce biogas which displaces natural gas.
- **Excess heat** from gasification process will produce high pressure steam running through a turbine generator to create biopower – Covanta – 154K tons of biomass will produce 17.5 mw of power for 10,000 homes.

Wastewater sludge to biopower

- Wastewater sludge can generate clean energy with an anaerobic digester or a gasifier that can mix wood chips with sludge to create a syngas which can be used to fire up a boiler or injected into a natural gas line
- Seminole Florida, feasibility study – Covington, TN

PICTURE WORTH A 1,000 WORDS



Landfill Gases

- **Technology** : Landfill wastes to power generation
- **Process** – household garbage rots and creates methane which is piped to turbine generators which produce electricity and used to provide power to public buildings
- **Companies**: Waste Management, Allied,
- **Local Governments**: Memphis, Johnson City and Alcoa,TN
- **Benefits** –, zero costs of feedstocks to produce clean energy. Landfill waste is already there.

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Tennessee Renewable Energy & Economic Development Council

1. **Chartered** by state on Aug 21, 2008: www.treedc.us

2. **Formed** by UT-MTAS, 4 mayors, small Knoxville firm and UT President Emeritus Dr. Joe Johnson

3. **Mission** – promote renewable energy with economic development

4. **Members** –65 cities, 8 counties in east, middle and west TN. TVA, ORNL, USDA Rural Development, TN Dept of Ag, ECOtality

5. **Activities** : Assisted in biodiesel recycling/production for Crossville and Clarksville / Held 9 forums – 800+ attendees – business networking across state – technology providers give presentations

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TREEDC Business Plan

- **TREEDC Business Plan for Local Governments**

1. **Network**: Organize statewide community forums to bring together stakeholders. Get the name out there! Create a knowledge base.

2. **Grants:** Partner with Dev. Districts and USDA Rural dev. – to seek renewable energy related grants : feasibility studies/project participation

3. **Technical Assistance:** Through UT - provide a needed resource for helping local govts use alternative fuels – biodiesel and bioenergy.

4. **Economic Development:** Accelerate market development of biofuels by assisting with UT/State Initiatives – Cellulosic ethanol and solar

5. **Advocacy/Education:** Be the voice for innovation and job creation for all-

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You can do it!

- Identify someone in the state others cherish and respect. Ask that person to be your figurehead.
- Start small. Involve key Mayors in a specific region and if that works out well, then go statewide.
- Engage the business community. In our experience, knowing that local elected officials will be attending a forum is the motivating factor for business involvement.
- Get the academic community and other resource agencies involved by asking them to co-host events.

Conclusion

1. We covered various technologies that could benefit local governments
2. Reviewed benefits and case examples
3. TREEDC
4. How to galvanize support
5. Enjoy the process

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