Transformation of Wood to Energy as a Management Strategy of Wood Waste at the Yolo County Landfill

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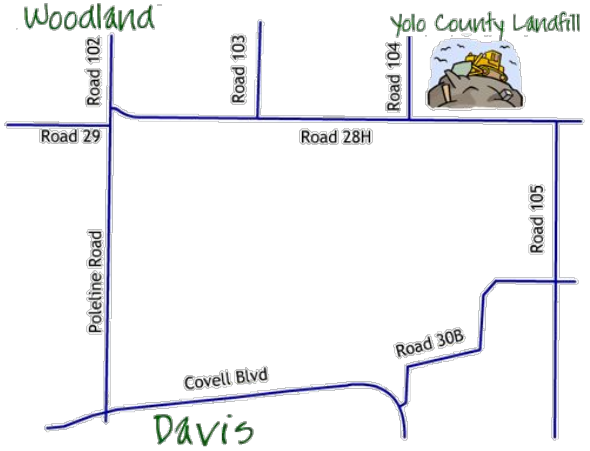
Problem Statement

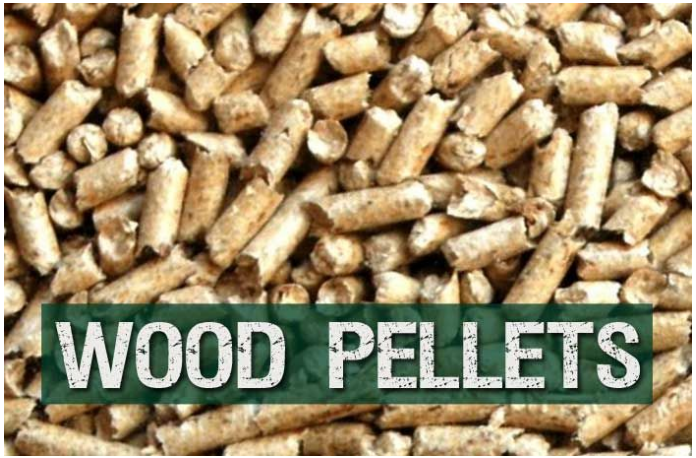
The Yolo County Landfill is looking at transforming wood into energy, including on-site gasification and pellet production for off-site wood-stove users, to manage an overabundance of wood waste.

Previously, the wood waste was used to generate power in collaboration with PG&E, but these power purchase agreements have not been renewed, thus the Landfill wants to determine if different wood-to-energy technologies are economically feasible and sustainable options for managing the material.



Background

- The Yolo County Landfill receives about 10,000 tons of wood waste/year
  - Mainly C&D
- Environmental, economic, and social costs:
  - Management costs, greenhouse gas production, and deforestation
- Possible biofuel technologies:
  - Wood chips for on-site gasifier
  - Making wood pellets and selling to consumers

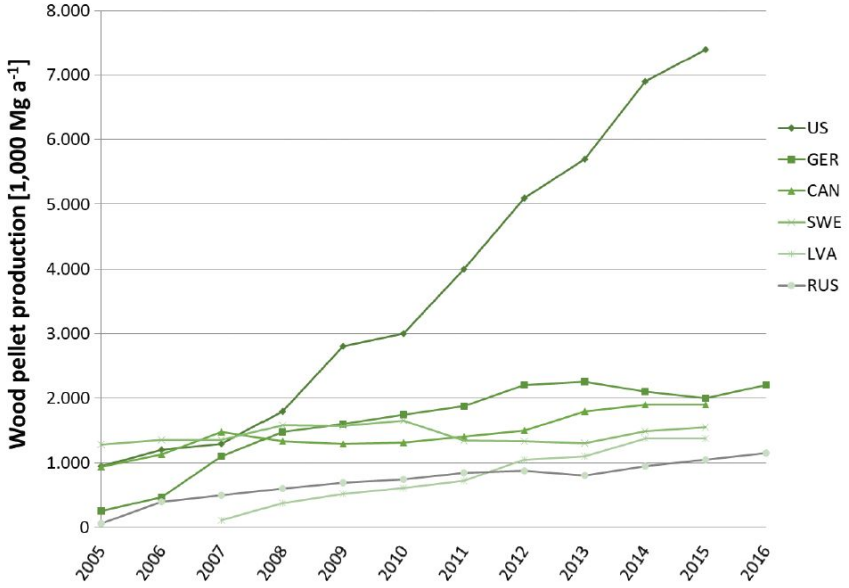


Research Findings

- Wood waste collected at the Yolo County Landfill can be converted to biofuel
- Manufacturing Wood Pellets
  - High energy density
  - Consistent quality
  - Increased capacity for multiple uses
  - Can be sold to distributors
- Gasifier
  - Can use chips or pellets
  - Wood chips are cheaper and easier to make

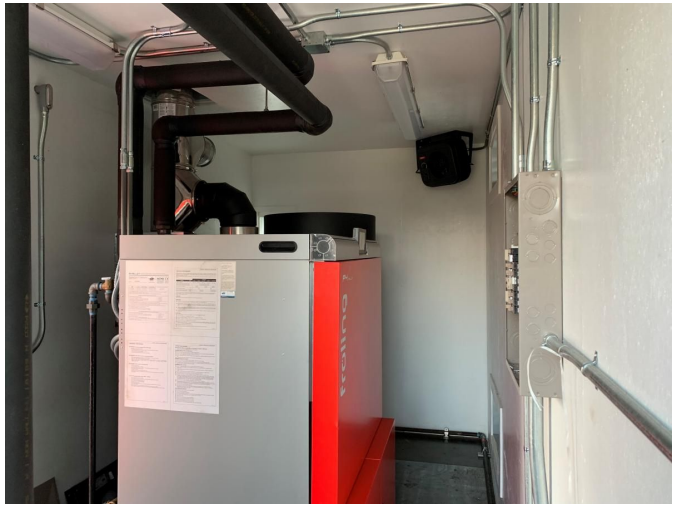
US Wood Pellet Supply and Demand

- US = largest producer
  - EU demand
  - Expanding residential heating market
- US = second largest consumer
  - Residential demand fluctuates
    - Season
    - How cold winters get
    - Price of heating oil, propane, and renewables
  - Industrial demand depends on energy/sustainability policy



Wood Pellets for Heating Schools

- Grant-funded wood pellet boiler heating system for Washington's Northport School District
- 70 tons of wood pellets/year vs. 8,500 gallons of oil
- After 3 months,
  - fuels costs cut in half
  - air pollutants dropped by 70%



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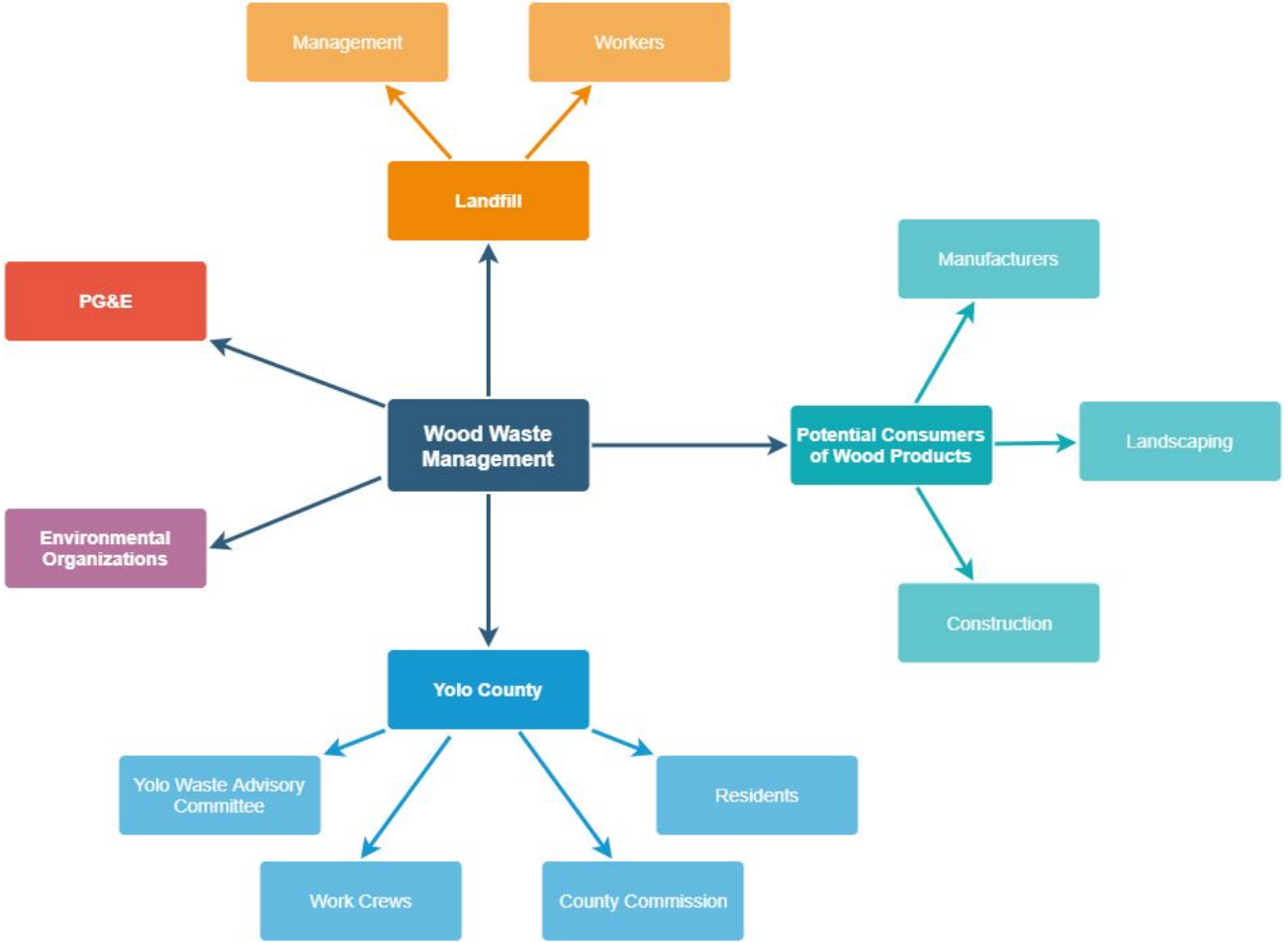
Wood Waste Biofuel Considerations

- Future of biofuel?
  - California - high price compared to renewables
  - Nationwide - biomass facility closures
- Wood waste-derived biofuel - questionable “carbon-neutral” status
  - Management techniques driven by industry imperatives
  - May not be achieving a low-carbon, environmentally sustainable, and circular economy

Stakeholder Analysis



Policy ID

- EU Waste Framework Directive (European Union, 2008) - prioritizes waste handling in five-stages:
  - Prevention
  - Preparing for re-use
  - Recycling
  - Other recovery (including energy recovery)
  - Disposal

Moving Forward

1. Does wood waste biofuel align with the long-term goals and overall economic, environmental, and social values of stakeholders?
2. Is there and will there be enough wood waste to warrant investment in biofuel technology at the landfill?
3. What are the implications of the PG&E contract ending on the future of biofuel production?
4. How much energy does the Yolo County landfill require and can a wood gasifier meet some, most, or all of the energy demands? Will it produce more than the landfill needs, and if so, how will this energy be distributed?
5. If the landfill pursues wood pellets, at what scale (local, state-wide, national, international) would they market and sell their product? What are the main markets at each of these scales?
6. What key partnerships could be established between the Yolo County Landfill and surrounding community to move forward this project?

Acknowledgements

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