



Date: 06/14/2022

Honorable Mayor and Council Members:

Author and title: Robert Womack, Emergency Services Coordinator

Title: **Truckee Bioenergy Scoping Study – Findings and Recommendations**

Approved By: \_\_\_\_\_ Jen Callaway, Town Manager

**Recommended Action:**

- A. Receive Bioenergy Scoping Study findings, provide direction to staff, and authorize the Town Manager to execute a contract amendment with Wildephor Consulting Services, LLC to complete a bioenergy feasibility- study in an amount not to exceed \$120,000.
- B. Authorize a budget adjustment of up to \$120,000 from the sustainability set aside to fund capital project C2314 which was previously identified as being funded with grant funds.

**Background:** Two of the Council's identified priorities are to reduce greenhouse gas emissions and become a leader in environmental sustainability and to engage partnerships and investments to drive emergency preparedness. In August 2021 Council directed staff to advance work plan task item 8.2a to support long-term partnership for a regional biomass facility with a biomass scoping study (C1510). This work plan item took the form of a partnership with the Truckee Tahoe Airport District (TTAD) and Truckee Fire Protection District (TFPD) to complete a scoping study of options that could be considered to help with some of the agencies' green waste disposal needs in a clean, environmentally friendly way, and could potentially provide an alternative thermal and/or power source for the included facilities (I.e. Town Hall and adjacent TFPD and TTAD facilities).

On August 2, 2021, Council authorized the Town Manager to enter into an agreement with Wildephor Consulting Services, LLC to complete a Bioenergy Scoping Study, in partnership with TTAD and TTFD. The cost of this scoping study was shared equally among the partner agencies at a total expense of \$19,200 or \$6,400 per entity. The specific objectives of the scoping study were to do the following:

- 1. Define specific problem to be solved – defining the “triple bottom line” economic, environmental and social objectives of the project partners
- 2. Collect and compile relevant data – identify potential heating and power loads as well as the type and quantity of biomass feedstock
- 3. Develop range of candidate solutions – evaluate a range of potential viable technology solutions to address the defined problem to be solved
- 4. Establish appropriate evaluation criteria – assessment of triple bottom line evaluation criteria

5. Evaluate candidate solutions – summary of attributes each candidate solution offers
6. Identify preferred solution(s) – identify potentially viable solutions that may be used as a basis for more rigorous feasibility assessment and conceptual design development

As a result of our community's proactive fuel reduction efforts, the Town, TTAD, and TFPD project that exponentially more green waste will be generated locally each year. Specifically, our three agencies will produce green waste through the Town's vegetation management program, the Fire District's new residential green waste pick-up program and/or the Airport District's green waste generated from maintenance of their properties. The Town's interest is to facilitate green waste removal and processing in a cost-effective way that contributes to our greenhouse gas reduction goals. The projection of the annual average green waste among the three partner agencies is just under 15,000 Bone Dry Tons (BDTs) per year. Couple this with the rising concern that the Eastern Regional Landfill (ERL), the current processing site for green waste, is continuing to have difficulty in material processing and disposal of collected product which has led the fee to dispose of green waste at the ERL to double, rising to \$12 per cubic foot from \$6 per cubic foot. This rise in cost for collection, processing and disposal cost at the ERL for the estimated projection in growth of green waste totals over \$1 million per year in the coming years.

It should be noted that there is regional interest and conversations occurring regarding bioenergy, particularly with a project designed for the Northstar village and conversations in Placer County regarding a new power generation biomass facility at the Cabin Creek property adjacent to the Eastern Regional Landfill Material Recovery Facility. Town staff, and our consultant, are participating in a regional biomass taskforce to coordinate these various efforts and data on projected green waste volumes, characterization, and uses/ disposal options within our region. All of these conversations focus on the regional need for multiple solutions, recognizing that no one facility or solution will solve our disposal issues.

Green waste disposal is important from an environmental perspective in that once in a landfill, untreated or unused green waste release greenhouse gas emissions, including methane, which is approximately twenty-five times more potent than CO<sub>2</sub>. Treated disposal of green waste helps to reduce greenhouse gas emissions, and in some cases can provide complete carbon sequestration. This is in direct alignment with Council adopted priorities, specifically to reduce greenhouse gas emissions and become a leader in environmental sustainability.

Containment and treatment of green waste can help to prevent fire spread and better prepare our community to fight a wildfire. Conversations with local and state fire partners point to the need to get green waste off the forest floor and out of the neighborhoods to reduce flammable material in the event a wildland fire starts. This is even more true after last year's winter storms that brought down trees throughout the Town and region leaving even more green waste to be disposed of than in normal years. While this is a single year problem, it is likely to continue in future years as drought stressed trees are less tolerant of winter storms. Working with partners like TFPD and Cal-Fire on green waste removal in an environmental responsible manner is in direct alignment with the Council adopted priority to engage partnerships and investments to drive emergency preparedness.

Another potential value add for this study is biomass power. While on the surface the potential cost benefits seem limited based on current study work, the idea of "green" power and the ability to maintain critical services at Town Hall, TTAD buildings, and TFPD firehouse during power outages could be a tangible benefit in several of the Council goals surrounding GHG and emergency preparedness.

In February 2022 the Council received an update on the initial scoping study and authorized the Town, in harmony with the partner agencies, to proceed with a second phase scoping study to further refine the details of the seven options and develop final recommendation for up to two options to advance into a

detailed feasibility study. The initial study first looked at different solutions, baselining them against continuing to dispose of green waste at the Eastern Regional Landfill (ERL). In the second phase scoping study, Wildephor determined that two possible options, Biomass Gasification Power and Combined Heat and Biochar, were likely the most promising options. As a part of this process, Wildephor looked at biochar as a revenue source, however more work is needed in this area to determine viability and revenues in this emerging market.

## **Discussion:**

The final scoping study has been provided in Attachment I and identifies the two options recommended for consideration to move forward. The first option Wildephor determined as most feasible, **Biomass gasification**, is a process whereby green waste feedstock is heated in an oxygen-limited environment, preventing combustion and instead producing a hydrocarbon-rich synthesis gas (“syngas”) that can be either combusted in a gas turbine or chemically converted to other liquid or gaseous biofuels. The primary source of revenue for a biomass power system would be from a power purchase agreement (PPA) negotiated with Truckee Donner Public Utility District (TDPUD). The partners would be guaranteed a long-term (e.g., 20 years) revenue stream from electricity sold into the regional grid at a stable price. Based on initial discussions with TDPUD staff, a PPA purchase price of \$0.10 per kilowatt-hour (kWh) was assumed and used on the preliminary calculations. Continued work is needed to refine this figure and ensure it meets the needs of all parties.

A secondary source of revenue from a biomass gasification facility would be biochar sales. Biochar is a charcoal-like byproduct of biomass conversion processes such as gasification and pyrolysis used for a range of purposes including as a soil amendment, a water and air filtration medium, and a construction material additive, among others. The market for biochar is rapidly evolving and consequently presents significant uncertainty. Further study would be required as it may not represent a reliable revenue source in the near term. Biochar does, however, provide a significant means of carbon sequestration, thus making this alternative more attractive than most others included in the scoping study in terms of its environmental benefits.

A tangible benefit of siting the Biomass Gasification facility near the airport would be the ability to potentially create a microgrid covering critical local government infrastructure including the TTAD facilities, the TFPD/Cal-Fire Station 96/50, the TDPUD airport well, and the Town Hall facilities. Reviews of the TDPUD infrastructure indicate few, if any, of their circuits could be completely covered by a 1-2 Mw facility (the proposed facility size), instead any micro-gridding will require appropriate connections and isolation points to ensure the facility is not overloaded. Preliminary work indicates the connections for this critical infrastructure microgrid already exist, along with the appropriate isolation points. Further studies with the TDPUD will be needed to determine if it is possible to cover other critical infrastructure in the area.

**A combined heat and biochar (CHAB) system** is the second potentially viable option. CHAB uses pyrolysis as the biomass conversion technology. This would be a “thermally-led” approach with biomass feedstocks converted into heat, with biochar and possibly a relatively small amount of electricity also being produced as co-products. Pyrolysis is a heat induced thermal decomposition process similar in many respects to gasification, but one that takes place in the absence of oxygen.

The largest source of revenue from the CHAB option would be from biochar sales. Biochar sales could represent more than 80% of annual project revenues, enough to cover all the estimated plant operating costs as well as the disposal costs for residual organic material not utilized by the pyrolysis system. \$150,000 per year could also be generated from offsetting heating and electrical utility costs at Truckee Tahoe Airport facilities.

The CHAB option also could offer another unique co-benefit in the form of hydronic snow melt for portions of the Truckee Tahoe Airport. Based on the quantities of organic waste the partners expect to generate, an appropriately sized CHAB system could produce enough supplemental heat to provide snow melting on high-traffic areas of the airport property. Although installation of hydronic snow melt systems can be relatively costly, the excess available waste heat from a pyrolysis plant could allow such a system to be cost effective if it were able to offset sufficient snow removal expenses.

In order to continue with this project and bring it to the design phase, the Town and its partners need to conduct a more in-depth feasibility assessment of 1) the biomass power option using gasification; and 2) the combined heat and biochar option using pyrolysis. A market study of biochar as a merchantable co-product of either biomass conversion process also needs to be conducted to better assess its possible financial contributions to any future capital project that may be undertaken by the partners.

Wildepfor has indicated it would cost approximately \$90,000 to complete the study and determine which facility is the best option for the Town and its partners. Wildepfor has also indicated it would require an additional \$30,000 to complete a marketability study on biochar and whether it is a cost-effective revenue stream.

The Town has unsuccessfully put in for several grants to fund this study, both fully and partially. We continue to look for opportunities to use grant funding, however, to stay on a reasonable timeline, we need to continue moving forward. We are working with the partner group, and potentially adding TDPUD as partner, to hopefully spread the \$120,000 across the three original partners and possibly a fourth agency partner. TTAD and TFPD will be presenting this information to their boards the week of June 20<sup>th</sup> at which time we will know if their respective boards are supportive of continuing with the partnership on this project.

It should be noted that, while pursuit of grant funding to support the feasibility analysis was unsuccessful, indications have been that the granting agencies are funding projects in larger amounts and on a larger scale than we asked for. While the two remaining options could require large capital outlays without grant funding, the projected \$1.2 million per year of disposal cost off-sets is also not included in the cost estimates at this time. In addition, staff and our consultant believe there are even more grant opportunities on the horizon to fund projects such as these, from both the state and federal government. For example, there is a new Wildfire Recovery and Forest Resilience grant program that was just opened with \$50 million in funding to be awarded over the next five years for projects such as these. Also, Assembly Bill 2878 (Forest Biomass Waste Utilization Program) which passed in the state assembly last month would establish additional incentives for projects like these. There are also FEMA Hazard Mitigation Grants (HMG) that will be available for larger projects in the near future.

**Conclusion:**

Staff recommends that the feasibility study advance forward and as such recommends that the Town Council receive the Bioenergy Scoping Study findings as provided in Attachment I, provide direction to, and authorize the Town Manager to execute a contract amendment with Wildepfor Consulting Services, LLC to complete a bioenergy feasibility study in an amount not to exceed \$120,000. The proposed FY22/23 budget for capital project C2314 includes the biomass feasibility study, however this budget identified an “unfunded grant source” to fund this study. Should Council wish to advance the feasibility study at this time, staff recommends Council authorize a budget adjustment of up to \$120,000 from the sustainability set aside to fund capital project C2314. Staff anticipates the full amount of this adjustment would not be needed and are optimistic that our partner agencies will also move forward with the feasibility study, providing a portion of the funding.

**Priority:**

Enhanced Communication     Climate and Greenhouse Gas     Housing

Infrastructure Investment

  

Reduction

Emergency and Wildfire Preparedness

  

Core Service

**Fiscal Impact:**

Up to \$120,000 budget adjustment from the sustainability set aside to fund capital project C2314 for the biomass feasibility study. Staff anticipates that the full funding amount would not be needed as our partner agencies are likely to continue with the partnership efforts.

**Public Communication:**

We continue to socialize this project during different community meetings and with potential stakeholders. We have also provided prior Council updates on the different components of the potential project.

**Attachments:**

Attachment I - Truckee Bioenergy Scoping Study – Findings and Recommendations