YAMPA VALLEY HOUSING AUTHORITY BOARD MEETING
December 15, 2022

Cole Hewitt, Yampa Valley Housing Authority Board President, called the meeting of the Yampa Valley Housing Authority to order at 2:00 p.m.

Board members participating included: Leah Wood, Catherine Carson, Cole Hewitt, Alison Brodie, Mike Beyer, Michael Ann Marchand, Heather Sloop, Luke Carrier, Tim Corrigan, and Kathi Meyer. Roger Ashton was absent.

Others present included: Jason Peasley, YVHA Executive Director; Kristy Marshall, YVHA Executive Assistant; La La Cartmill, Regional Property Manager; Mandy Tomassetti, Assistant RPM; Sheila Henderson, Brown Ranch; Dylan Anderson, *Steamboat Pilot &* Today; Bob Schneider; Michael Buccino; Axel Rios, Jim Beers, Patrick Phillips; Reese Freeman and Ed MacArthur.

EN RE: ENERGY SYSTEM ECONOMIC ANALYSIS & DESIGN

Mr. Greg Tinkler, the project lead at Page Consulting, introduced the team, including Jimmy Principe, Jill Kurtz, Catherine Tinkler, Paul Bony, and Jamie Flatt. He stated that Page was tasked with creating a detailed Energy Master Plan for Brown Ranch taking into account the upfront cost, the lifecycle cost, resilience, and carbon footprint. He described the modeling used to evaluate the overall energy needs of all elements and buildings anticipated. Ms. Tinkler noted that the models take into account the vision statements and priorities for Brown Ranch laid out in the Community Development Plan. She stated that this meeting would focus on the analytical framework used to evaluate the options, the results of that analysis and the metrics employed. Ms. Tinkler said that this session would be about energy needs and the options available. At the next session information regarding cost and triple bottom line value analysis will be presented.

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Mr. Principe stated that the energy analysis requires defined goals and metrics, an understanding of what variables can be changed and the options to be considered. The fixed variables for this project were the local climate, the building types, the occupancy schedules, the ventilation demands, lighting/controls, and appliances and equipment. The variables that were evaluated include the envelope construction, the mechanical systems employed, and the energy fuel sources. Future climate scenarios and different building masses and orientations were not included in the analysis. Mr. Principe stated that the analysis was based on the building types and square footages described in the Brown Ranch Community Development Plan. He presented the baseline requirements for IECC 2021 building envelopes and those of the very efficient Passive House compliant envelopes. In response to a question from Tim, Mr. Principe said that there is a diminishing return on energy performance from adding an extreme insulation beyond a certain level. He said that the Passive House is considered an outer boundary of insulation and noted that the biggest difference is the glazing requirement. Mr. Principe reviewed the six mechanical systems considered, as defined in the RFP for the project, except for the baseline option which was modified to meet the minimum requirements for potential grant funding. He explained that heat pumps must be supplemented by a secondary heating source during extremely cold periods.

Mr. Principe stated that each of the 9 building types was modeled using both envelope types and all six mechanical system types, for a total of 108 models. He reviewed the detailed spreadsheets that went into each model. He described the EUI, which is the per square foot measure of energy use over a year that enables a comparison of energy use across different sizes and types of buildings. Other measures considered were the total energy used over the year and the highest peak energy demand.

Mr. Principe presented the results of the multi-family building type, as that type makes up the largest square footage of the built environment within the development. He noted that the geothermal based systems significantly outperform the air-based systems in both the IECC 2021 envelope and the Passive House envelop. The Passive House was slightly (6%) more efficient than the IECC 2021 envelope using a geothermal system, and 18% more efficient using the air-based system. Mr. Principe reviewed a chart of maximum demand expected. Under this analysis, the Passive House design would reduce the peak demand 15 - 20% across all mechanical system options. He noted that this analysis is only for the buildings; other energy demands are not included in this analysis and would remain consistent across all options. Mike explained that the electrical substation would have to be built to the peak demand level. Mr. Principe then presented a chart comparing the relative peak demand for each building type. Although the peak demand tracks pretty closely with square footage, retail space and schools have, for their size, higher peak demand. He also presented the profiles of peak demand for electricity of heating and cooling with natural gas back-up, electrical back-up and geothermal. Geothermal has the most stable demand and lowest peak, electrical has the highest and most variable peak demand. There was a discussion on the variables that affect peak demand.

Mr. Principe presented a table with the annual energy use (both EUI and cost in 2022 dollars), peak electrical load and variability, and on-site carbon emissions across the two building envelope types and the six heating and cooling options for the multi-family buildings. He noted that the ground source options are the most efficient and cheaper operationally, albeit more expensive upfront – at least before incentives. The Passive House envelope shows an improvement over the IECC 2021 envelope in all categories. Mr. Principe offered the following takeaways:

- Geothermal heat pumps (options 4 & 5) perform better and air-source heat pumps (EUI, annual energy and peak electrical demand.
- Electrical only air-based mechanical systems (options 2 & 3) have a slightly lower energy usage annually as compared to systems with gas heat, but a significantly higher peak electrical demand.
- Envelope difference had a larger impact on less efficient mechanical systems (options 1, 2 & 3).

The general challenges were summarized as: the long-term affordability and availability of natural gas; affordability; available capacity from YVEA; and the current lead time for substation transformers. There was a discussion of the difficulty of making cost estimates without a clear understanding of what is going to be built and what the peak and variable demand will be. Regarding the high first cost of geothermal, Mr. Tinkler stated that the Inflation Reduction Act includes significant tax credits for geothermal systems with provisions for cash conversion to non-profit organizations and a market for tax credits. Mr. Principe added that there are also grant opportunities for such systems.

Ms. Tinkler suggested that the YVHA Board needs to narrow its options prior to having the Page team do a thorough cost and value analysis. Tim asked about the long-term viability of a ground source system.

Mr. Tinkler said that he was confident in the reliability of such systems, provided that the system is designed and installed properly.

Emily recognized the community members that have helped YVHA reach this point. She noted that defining the energy needs and sources for the community is key to delivering housing at Brown Ranch and emphasized the importance of moving quickly. Jason said that while he is attracted conceptually to a geothermal solution, it is important that the Board follow the guiding principles established by the Steering Committee and to prioritize the results for the end users with affordability first and sustainability second.

Mike Beyer stated it seems that in this case the operational affordability and the sustainability line up. The question will be what the upfront costs are.

Reece Freeman asked about the source of the heating and cooling demand of the Passive House. Mr. Principe said that the base energy code (IECC 2021) has improved to such an extent that the difference between it and the Passive House standard has declined. He added that the analysis is based on code standard efficiencies of heating, cooling and lighting. Most buildings exceed these standards. Routt County plans to adopt the 2021 code sometime in 2023.

Ed MacArthur asked about the differences between community and individual geothermal systems. There was a discussion of the capital benefit versus the operational benefit. Mr. Tinkler described some existing community loop systems for which there is good data available on reliability and cost. Ms. Tinkler said that the triple bottom line value analysis to be discussed at the next session will cover not only the costs but also the risks and the level of expertise necessary to own, maintain and repair the system. Paul Bony described some large community loop systems that employee different models. He noted that the community loop systems take the burden of repair and maintenance off the individual homeowner. Mr. Principe described how a geothermal system would serve a multi-family building and how a community system would install loops under parks, parking lots, and other areas within the community. He described how a phased approach could be designed.

Mike suggested that one of the options that should be included in the value analysis is the community loop geothermal with the standard envelope. He noted that another factor to consider is the cost of installing natural gas infrastructure in addition to the electrical infrastructure that will be needed, regardless. Jason agreed that the decision regarding gas is significant and must be made soon. Leah offered that looking at different mechanical systems was more important than choosing the envelope type. Kathi said that the impact of financing of the end product should also be considered, as the energy source can influence the ability for individuals to borrow money. In response to a question from Michael Ann, Mr. Principe said that geothermal aligns well with the push toward electrification, in part because it uses electricity more efficiently and thus reduces the demand on the grid. Michael Ann asked about storage options to help reduce peak demand. Mr. Principe offered that storage can be added, but the issue remains of how that storage will be charged. Ms. Tinkler reviewed the cost elements that will be included in the triple bottom line value analysis. Catherine suggested that natural gas is being phased out and should not be considered. Mr. Principe suggested that the natural gas baseline option should be considered, if only for comparison to “business as usual.” Roger suggested that an all-electric option should also be considered. There was general agreement to include the IECC 2021 envelope in all options considered in the value analysis: baseline with gas, all electric and geothermal with a community system.

EN RE: ADJOURNMENT

The regular meeting of the YVHA Board of Directors was adjourned at 1:45 p.m.

No further business coming before the Board, same adjourned sine die.

Sarah Katherman, Minute Taker

Cole Hewitt, President