Transitioning Horse Manure from Waste to Resources: A Sustainable Energy Approach for Los Angeles Equestrian Districts of Glendale Riverside Rancho, Burbank Equestrian District, Los Angeles Equestrian Center, and Los Angeles Atwater Equestrian District

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SUMMARY

Research conducted in the United States and Europe has demonstrated that improper storage and management of horse manure can lead to increased ammonia emissions, particularly under wet or anaerobic conditions. This volatilization occurs during the breakdown of urea by urease enzymes released by bacteria in the manure. In urban horse communities such as those in Glendale, Burbank, and the Los Angeles Equestrian Center, there is a potential solution that shifts the focus from costly manure removal and storage to utilizing horse manure as a biomass resource for energy generation. With an average 1,000-pound horse producing 8-10 tons of manure annually—equivalent to approximately 15 megawatt hours of energy—manure from just two horses can power a single-family home for a year. If effectively harnessed, manure from the estimated 1,500 horses in these communities could provide energy for approximately 750 homes annually. Further analysis and feasibility studies are required, but this innovative approach could transform horse manure into a sustainable contribution towards renewable energy, while also mitigating ammonia emissions.

Studies in the United States and in European countries, have shown that horse manure storage accounts for increased ammonia emissions. When manure is improperly stored and managed, depending on wet or anaerobic conditions, it can result in volatilization of ammonia. The emissions of ammonia can occur during storge during the breakdown of urea in the manure by urease enzymes, which then are released by bacteria. While proper manure management and storage can help to mitigate, by regular removal, aerobic composting, moisture management, and manure covering. However, as with many horse communities, in the Glendale, Burbank, and the Los Angeles Equestrian Center, rather than the expense of removal and storage, and potential risk of ammonia emissions, they can utilize horse manure for its biomass potential, while reducing ammonia emission risk (Barahone and Almulhim, 2024; Da Lio, et al, 2021; Dickson, 2019; Manir et al., 2023; Poo power: Horse manure from World Cup powers Helsinki homes, 2019; Young, et al., 2012).

By taking advantage of newer solutions of bedding and manure management for residential barns, commercial stables, in Glendale and Burbank, including the Los Angeles Equestrian Center (and the Los Angeles Atwater Equestrian District), can utilize various types of portable horse manure collection from stables than incinerated at portable or stationary power plants to create environmentally friendly energy sources (Fortum, 2017; Namuli and Pillay, 2012). The average 1,000 pounds horse produces between 8-10 tons of manure annually. Studies have shown that this is equivalent to 15 megawatt hours of energy. Therefore, manure from two horses can power a single-family home for one year (Fortum, 2017; Taner, 2019). With an estimated 1,500 horses in the rancho communities, this could

provide power to 750 single-family homes each year. This would provide energy to the entire broader rancho communities.

While further analysis and feasibility studies are needed to strategically validate its efficacy, the urban horse communities of the Glendale Riverside Rancho, Burbank Equestrian District, Los Angeles Equestrian Center, and Los Angeles Atwater Equestrian District, could utilize horse manure for energy purposes as a sustainable contribution to renewable energy (Da Lio, et al, 2021; Renovables, 2024; Svanberg, et al., 2017).

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