SUSTAINABILITY ADVISORY BOARD
THE CITY OF KEY WEST

P.O. BOX 1409
KEY WEST, FL 33041-1409

To: City Commissioners
Patti McLaughlin, City Manager
Kelly Crowe, Utilities Director

Date: July 14, 2022

Re: Gasification Potential

Dear Leaders,

We would like to thank the Commission for requesting our recommendations regarding gasification.

We were pleased to hear that the Utilities Department had pulled the Waste to Energy feasibility study from the Commission agenda in order to potentially include gasification in the study.

We think it is important to consider all options that will reduce our carbon footprint and expenses and want to make sure that the feasibility study is well rounded in its efforts to find long term environmental solutions. To that end, we think it is very important to emphasize the environmental tradeoffs that may be inherent with each option.

We are interested in any byproducts associated with the technologies considered as well as what is and isn't released during combustion and other WTE/Gasification process. In particular, asbestos was mentioned, as it is a common building material still found within many buildings throughout the Keys.

The Board reviewed gasification in general (summary on the next page) and believes that while incredibly promising, the technology might still not be settled enough to bring to our environment. But we do encourage the feasibility study to look at all options and draw their own conclusions.

It goes without saying that strong Insurance and Bonding requirements for any final contract will be important. The Board also discussed the strong possibility some factions of the public may not trust the technology, and regardless of permits from federal and state environmental entities, might seek to sue the city for unrelated issues. This is yet another reason why it will be important to choose a well-vetted and established technology.

Sincerely,

Dakin Weekley
Chair, Sustainability Advisory Board
dakinweekley@gmail.com 305-797-1061

Gasification Overview

Waste gasification is a chemical process where trash is heated in a low-oxygen environment to the point that it breaks down into its constituent molecules. This reaction has two products: a combustible gas called syngas and inert slag or char. Depending on how it is processed, syngas can be used directly for electricity generation, or it can be refined into a variety of valuable products including diesel, hydrogen, and useful chemicals.

The option of refining syngas into synthetic fuels that can power internal combustion engines makes gasification a far more flexible WTE solution than incineration, which is limited to producing electricity and heat. Gasification is also the more efficient option for electricity generation. While conventional incinerators can net about 530 kWh of electricity from one ton of waste, gasification systems with integrated generation can net between 650 and 1,000 kWh from the same amount of trash. Syngas can also be cleaned of contaminants pre-combustion, making it safer for the environment than incineration with post-combustion emissions controls.

California has the highest emissions regulations in the country, and also the highest incentives through it's low-carbon fuel standard program which provides credits to companies that sell cleaner fuels. It's no surprise that the most current fledgling projects are in California:

- Truckee, CA (next to Lake Tahoe) is just starting (July 2022) a feasibility study for biomass gasification plant at it's airport.

- Lancaster, CA just signed a deal (May 2020) to use plasma gasification to make hydrogen. The company Solena group has no commercial track record and does not have financing yet. They almost built a plant with British Airways in London, but oil prices undercut the market.

- Kern County, CA will be a test site for Mote of LA to create a biomass gasification plant that also captures carbon emissions and sequesters them by early 2024. Known as BECCS technology, there are 16 such plants globally to date, nearly all in pilot/demonstration phases.

The US federal research institute, Lawrence Livermore National Laboratory, identified biomass gasification as one of 3 pillars for reducing CO2 for California (Jan 2022).

The DOE US Gasification Database, listing projects that have commercial potential was last updated in 2016. It lists 23 plants as being actively moving forward, 27 as delayed/cancelled and 9 as other. In 2020, the Kleinman Center for Energy Policy reported that no US plant was doing gasification at commercial scale. This has been mostly due to the low cost of natural gas. The DOE World Gasification database lists 72 as actively moving forward, 10 as delayed/cancelled and 3 as other.

Summary: Gasification holds great promise, especially those projects in highly regulated California, but it is probably not established enough to pilot in our environment.