

Progress of Anaerobic Digestion (AD) in the European Union (EU) versus the United States (US)

During the Los Angeles County Solid Waste Management Committee/Integrated Waste Management Task Force meeting on July 16, 2020, Ms. Margaret Clark, Vice Chair, requested information on the progress of anaerobic digestion (AD) technologies used to divert solid waste from landfills in the European Union (EU) compared to the United States (US). Staff has compiled the information below prepared by Tetra Tech, Inc., to explore how the EU has advanced ahead of the US in the use of AD for management of source-separated organic waste and the organic fraction of municipal solid waste.

Progress

The European Bioplastics Council states that Europe went from having 3 AD facilities in 1990 to 290 AD facilities in 2015. The development of AD facilities in the US has been limited but is increasing. In a survey performed by the US Environmental Protection Agency in 2018, there were approximately 198 operational AD facilities that accepted food waste.

Landfill Tipping Fees and Disposal Bans

Western European countries started taking action to divert organics from landfills in the mid-1990's. Some countries, such as Germany, promoted organics diversion through legislation (i.e. landfill bans for unprocessed organic materials), while others, such as the UK, imposed tariffs on landfill tipping fees. Sweden has a landfill tipping fee of \$147 per ton and an additional landfill tax of \$68 per ton, for a total of \$215 per ton. Sweden only landfills one percent of their waste. Austria has a high landfill tipping fee of \$97 per ton and an additional landfill tax of \$35 per ton, for a total of \$132 per ton. Austria also only landfills one percent of their waste.

In comparison, current landfill tipping fees in Los Angeles County are typically around \$55 per ton. The Puente Hills Materials Recovery Facility charges around \$70 per ton to receive food waste and preprocess it for co-digestion with sewage sludge at the Carson Joint Water Pollution Control Plant. There is little economic incentive to develop AD facilities unless the revenues from electricity, fuel, renewable natural gas (RNG), and/or compost production can offset the \$15 per ton deficit for processing.

California has taken steps to mandate diversion of organic waste from landfills. Senate Bill 1383 (2016) requires mandatory collection and recycling of organic waste to reduce Statewide disposal of organic waste 75 percent by the year 2025. Cost increases for rate payers will contribute toward the development of new or expanded AD facilities.

Energy Costs

Electricity costs in the EU are two or three times higher than electricity costs in the US. For example, in 2016, the average residential electricity rate in the EU was 26.6 cents per kilowatt-hour compared to 12.7 cents in the US. Some of these increases are due to governmental renewable energy incentives. High potential energy revenues have led to AD becoming more economically favorable in the EU than in the US.

Public Policy

The lower tipping fees and lower energy costs in the US make it financially difficult to develop AD facilities without regulatory requirements and financial incentives.

The EU implemented the European Green Deal (Green Deal) on December 11, 2019 to achieve climate neutrality by 2050. The Deal includes a "Roadmap to Actions" that includes AD in multiple policy areas, such as increasing the use of biofuels; investment in AD to produce biogas from solid waste and wastewater; sustainable agriculture; and renewable energy. The EU will also provide financial support and technical assistance for those that are affected by the move towards the green economy. This is called the "Just Transition Mechanism" and will help mobilize at least €100 billion from 2021 through 2027 in the most affected regions.

The US has no nationwide carbon neutrality goal and also withdrew from the 2019 Paris Agreement, a voluntary cooperative agreement to reduce greenhouse gas emissions, while the EU is still a member. However, there are programs in the US that promote the development of AD facilities. The US has a federal renewable fuel standard (RFS) program to expand the nation's renewable fuels sector by providing credits to renewable fuels, such as those created from AD. States can also set their own emissions reduction goals. These goals often incorporate carbon pricing (cap-and-trade programs, carbon taxes), emissions limits (Climate Action Plans), energy efficiency mandates and incentives, and incentives to promote cleaner transportation (Low Carbon Fuel Standards [LCFS]) and cleaner energy (Renewables Portfolio Standard [RPS]). Currently, the District of Columbia and 23 states, including California, have implemented greenhouse gas emissions targets.

The US House of Representatives formed a "House Select Committee on the Climate Crisis" and introduced a "Congressional Action Plan for a Clean Energy Economy..." which was released in June 2020. The plan calls for carbon neutrality by 2050 and includes 12 pillars, including several that would support development of AD facilities such as investment in clean energy, decarbonization, and agriculture. The plan would require a financial contribution of approximately \$6 billion per year over the next 10 years from the federal government. The bill failed to receive bi-partisan support. Until Congress can develop a unified strategy, the US may remain behind in establishing climate change goals that would bolster the financial feasibility of AD facilities.

Conclusion

Ultimately, economic considerations are by far the main reasons for the discrepancy between development of AD facilities in the EU and US. In Europe, the costs to develop and operate AD facilities have been offset by high landfill tipping fees, high energy revenues, and financial incentives. The US can promote increased development of AD facilities by adopting similar policies.