CARBON EMISSIONS REDUCTION AND NUTRIENTS RECOVERY IN WASTEWATER TREATMENT PLANTS

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Today's concerns about greenhouse gases (GHG) are a world-wide issue. Wastewater treatment plants (WWTPs) are included. These facilities play a fundamental role in our society. Water recycling helps the environment and contributes to reducing waterborne diseases. Processes performed in WWTPs vary, but typically include headworks, grit removal, mixing, clarifying, nutrients removal, filtering, disinfection, discharging to local water bodies or open fields, and handling and proper disposal of solid objects. In some plants biogas is generated. Although wastewater treatment is a mature technology, there is significant potential for improvements from an economic and energy efficiency perspective, and to reduce the amount of emitted GHG, as are carbon dioxide and nitrogen oxide.

Energy consumption, GHG emissions, waste management, and productivity data from 20 WWTPs in Florida are presented. The plants range in their processing capacity from 5.5-55 million gallons/day of wastewater treated. For all plants, both an energy use baseline and a carbon dioxide (CO_2) emissions baseline has been established. Several assessment recommendations (ARs) have been identified. These ARs were all evaluated technically and ensure a speedy payback. Areas of potential improvements included motors, pumps, aerators, blowers, lighting, compressed air, occupancy sensors, disinfection, boilers, combined heat and power systems, biogas utilization and processing, insulation, heat recovery, photovoltaics, power generators, nutrients recovery, and energy management systems. Many of these improvements show great opportunities for GHG reduction. It was observed that the electric energy rate structure has a significant impact on the operational costs of WWTPs. Plants that further treat their sludge when biogas is being generated onsite can produce biofertilizers of high grade and can sell it for profit, reducing CO_2 and recover some nutrients. The overall cost savings for all WWTPs studied was as high as $20 million, with an associated reduction in energy consumption of 18% and emissions reduction per plant.

PRESENTER BIO**:** Dr. Cardenas-Lailhacar is an engineer in the Department of Mechanical and Aerospace Engineering at the University of Florida. He has more than 24 years of experience in energy management. He has led over 330 energy audits to manufacturing facilities in the US and Latin America, and service in some governments.