

Energy & Greenhouse Gas Impact Assessment Conducted for Graphenix Development Inc.

Graphenix Development Inc. (Graphenix) is developing high energy density electrodes for use in super-capacitors. Graphenix expects their high energy density electrodes to enable the use of super-capacitors and ultra-capacitors in renewable energy grid storage applications and in mass transit and automotive applications. Graphenix also expects that combining ultra-capacitors with Li-Ion battery technology will improve the response time and increase the useful life of energy storage systems.

CHALLENGE

Graphenix requested New York State Pollution Prevention Institute (NYSP21) to estimate greenhouse gas (GHG) impacts (CO₂e) for ultra-capacitors that utilize Graphenix technology in three market segments; automotive, mass transit and grid energy storage.

SOLUTION

NYSP21 estimated the clean energy impact, energy saved and GHG reduction potential for Graphenix's high energy density electrode technology. GHG impact analysis were conducted for Graphenix Ultra-capacitors for transportation, specifically with light-duty vehicles and subways. NYSP21 compared the fuel use of automobiles without start/stop and with start/stop using batteries alone, to automobiles using start/stop systems with battery/ultra-capacitor storage outfitted with the Graphenix technology.

Additionally, NYSP21 evaluated Graphenix's Ultra-capacitors as applied to renewable energy generation in New York State. NYSP21 compared the GHG emissions of the New York State power grid to the GHG emissions of a solar or wind generating facility using a battery/ultra-capacitor storage system utilizing Graphenix technology.

RESULTS

NYSP21 estimates the annual GHG emissions impact are as follows, based on information and claims provided by Graphenix.

- The use of their technology in start/stop light-duty vehicle systems would increase overall fuel economy by 7% in vehicles with start/stop systems and 10% in vehicles without start/stop technology. This results in an estimated reduction in GHG emissions of 72 Million Metric Tonnes (MMT) CO₂e annually.
- Southeastern Pennsylvania Transportation Authority estimates up to 10% energy reduction with the installation of battery/super-capacitor storage systems. Based on this analysis, the New York City subway system could realize up to an estimated 0.028 MMT CO₂e GHG emissions reduction annually when using Graphenix's Ultra-capacitors.

CHALLENGE

- Conduct a GHG impact analysis for Graphenix's high energy density electrode technology

SOLUTION

- NYSP21 estimated the clean energy impact, energy saved and GHG reduction potential for Graphenix's high energy density electrode technology
- NYSP21 evaluated Graphenix's Ultra-capacitors as applied to renewable energy generation in New York State

RESULTS

- The work performed by NYSP21 led to key results that will assist Graphenix with utilizing the market segments of automotive, mass transit and energy storage
- Start/stop technology in light-duty vehicles resulted in an estimated reduction in GHG emissions of 72 MMT CO₂e annually
- New York City subway system could realize up to an estimated 0.028 MMT CO₂e GHG emissions reduction annually when using Graphenix's Ultra-capacitors
- Graphenix's technology in grid storage systems would increase implementation of renewable generation by 20% of the current renewable power capacity in New York State, reducing the grid related GHG emissions by an estimated 0.23 MMT CO₂e annually

- Based on Graphenix estimates, the use of Graphenix's technology in grid storage systems would increase implementation of renewable generation by 20% of the current renewable power capacity in New York State. The associated reduction in GHG emissions is estimated to be 0.23 MMT CO₂e annually, equivalent to the emissions from approximately 50,000 passenger cars.

Graphenix estimates the creation of 20-30 jobs over 3 years in support of product manufacturing in New York State.

NYSP2I PARTNERS



New York Manufacturing Extension Partnership

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