Integrated Approach to the Production of Biofuels and Engines

Biofuels have emerged as a key part of the national plan to reduce dependence on imported energy and decrease greenhouse gas emissions.

The Challenge

Historically, combustion regimes and overall engine designs have been dictated by a given set of fuel properties. This approach may work well for one particular fuel, but times are changing. We now live in a world with a wide variety of new biofuels and advanced engines. A need exists to bring the development of these two elements together.

Argonne biophysicist Philip Laible oversees the growth of new variants of photosynthetic bacteria designed to produce target biofuel molecules.

The Solution

Argonne is uniquely qualified to pioneer an integrated approach to the production of new biofuels and engines. The lab has programs in theoretical and experimental combustion chemistry and a renowned transportation program with strengths in engine characterization and testing, environmental impact analysis and fuel development. This combination of expertise and resources puts Argonne researchers in an ideal position to specifically design fuel properties around the requirements of an engine, and vice versa.

Argonne mechanical engineer Doug Longman uses a volt meter to check the electronic system on a modern diesel engine. The research team will use Argonne's engine testing facilities to measure the performance and emissions of newly developed biofuels.

The Future

The lab's multidisciplinary team is combining basic and applied science, sharing its findings and brainstorming solutions that will lead to its ultimate goal—new higher-performance, lower-emissions combustion strategies and engine designs. The collaborative effort includes in-depth research on fuel production, combustion analysis, engine evaluation, and life cycle analysis and process economics.

"Not only could this effort lead to cleaner, more efficient vehicles, it could also result in groundbreaking, new paradigms for the transportation industry," **said Doug Longman, mechanical engineer, Argonne National Laboratory.**

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