About the Propane Education & Research Council

The Propane Education & Research Council (PERC) promotes the safe, efficient use of propane as a preferred energy source. With the passing of the Propane Education and Research Act (PERA) in 1996 by the U.S. Congress, the propane industry began to conduct a referendum among propane producers and marketers, who overwhelmingly approved the formation of PERC.

PERC receives funding by an assessment or “check-off” on each gallon of odorized propane gas sold. The assessment will collect five-tenths of one cent per gallon in 2006. The assessment is projected to collect $50.4 million dollars in 2006 to fund programs and projects.

Through PERC, the propane industry has committed itself to a multiyear, multimillion-dollar effort to improve consumer and employee safety, fund research and development of new and more efficient propane equipment, and expand public awareness of propane and its many uses and advantages.

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Credits

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Propane is an essential part of America's energy future, and new and improved technology is essential to the future of propane markets and the propane industry.

Today, more consumers than ever before are aware of propane and its benefits as an exceptional energy source that is clean, reliable, efficient, and a good value. As consumers continue to gain more knowledge about their energy choices, their demand for technology that better meets their energy needs grows even greater. In order to earn future business, propane technology must meet or exceed consumer energy needs as well as build new consumer demand. It is this challenge that has motivated the industry's research and development efforts over the last decade.

The following pages provide a general update on PERC's research and development efforts. These technology programs and projects have been directed from the beginning by a dedicated corps of industry volunteers, and implemented by professional staff and research partners. In addition, two remarkable industry CEOs, Mark Alexander of Suburban Energy and Stuart Weidie of Blossman Gas, have chaired PERC's Research and Development Advisory Committee, literally building the research program from scratch. The industry has been well-served by Stuart and Mark's efforts, and we are all indebted to them.

The industry's technology initiatives range from improving basic appliances to building and testing new propane components for the next generation of electric power systems. The underlying aim of all of PERC's research and technology efforts is to unleash propane's full potential and help bring new propane-powered products to market.

In one of PERC's largest technology initiatives to date, we teamed up with the Southwest Research Institute to research and demonstrate new propane-powered forklifts capable of meeting stricter emissions requirements well in advance of EPA regulations that take effect in 2007. Today, sales of the new propane forklifts remain strong and posted more than a 12 percent increase last year!

In other engine fuel markets, the industry is well positioned to take advantage of new propane engine fuel tax incentives that went into effect December 31, 2005, and is expanding into new engine markets in agriculture, commercial mowing, and airport ground service equipment.

In residential and commercial markets, research on power generation for homes and businesses may some day enable the industry to economically produce electricity rather than just compete against it. Combined space/water heating systems for manufactured housing and desiccant dehumidifier technologies may boost year-round propane sales while bringing consumers more efficient, comfortable home heating and cooling. Working in combination with solar and wind technologies, propane hybrid systems offer hope for clean, sustainable power generation that supports the renewable components when the sun doesn't shine or wind doesn't blow.

On the farm, propane remains strong. Working with top agricultural research universities and leading farm equipment manufacturers, the industry has planted the seeds for a more organic harvest in which propane-powered equipment produces heat, flame, and steam to replace chemical treatments and to help farmers with many tasks related to crop and livestock management.

As our research and technology efforts continue in the months and years ahead, I am confident that these initiatives will produce new technologies that open new markets for propane—a truly exceptional energy source.

Roy Willis, President and CEO
Propane Education & Research Council
PERC’s research and development mission brought together propane industry members, universities, manufacturers, and government to achieve the following results in 2005:

- **Leverage co-funding for R&D priorities.** PERC signed agreements with the U.S. Department of Energy (DOE) to support propane-fueled engine development and with the U.S. Department of Agriculture’s Agricultural Research Service (ARS) to support the development of propane-fueled agricultural technologies. These agreements leveraged PERC funds with matching federal funds for maximum return on investment.

- **Explore critical markets for propane fuel and facilitate market entry.** Studies explored agricultural producers’ perceptions of propane in remote refueling applications, identified key airport opportunities for marketing propane, set the stage for National Fire Protection Association (NFPA) approval of composite cylinders for indoor use in cabinet heaters, and helped preserve propane’s position as the leading fuel in the forklift engine market.

- **Develop, demonstrate, and commercialize technologies to increase propane demand, especially in off-peak months.** Projects developing technologies for residential combined space/water heating, distributed generation, and thermal weed control showed tremendous potential for increasing year-round and late-summer demand for propane. Composite propane cylinders and a propane-powered poultry house sanitizer became available for purchase. In addition, Blue Bird Corporation expressed interest in developing, testing, and marketing a dedicated propane version of their Vision school bus.

- **Build strategic partnerships.** Research partnerships with the National Propane Gas Association (NPGA) and Battelle Memorial Institute explored issues essential to preparing composite cylinders for indoor use. PERC also supported international technology development and transfer via global technology coordination with the World LP Gas Association (WLPGA). PERC and WLPGA began to plan the first-ever Global Technology Conference (GTC), to be held October 19–20 in Chicago, Illinois, immediately following the 2006 World LP Gas Forum. Co-sponsored by PERC and WLPGA, the GTC will foster a global exchange of technical information to increase global market share for propane.
R&D Investments, 2000–2005

PERC’s research and development mission invests in critical technology areas that hold the greatest promise for expanding the propane market. In 2005, considerable time and energy was devoted to completing projects approved in past years. In 2006, PERC plans to support R&D with a budget of just over $6 million.

2005 R&D Investments

In 2005, PERC invested more than $2.6 million to support propane R&D.
Good practices developed for propane quality assurance

All stakeholders in the propane industry have a common interest in maintaining propane quality, which must be protected throughout the supply chain from the loading rack to the consumer's tank. PERC conducted the following research efforts to help custodians of propane maintain high quality:

- **Good Practices for the Care and Custody of Propane in the Supply Chain (Docket 11352)** identified propane quality problems, potential contamination sources, testing methods, and prevention techniques. The study established good practices for producing, transporting, receiving, conditioning, storing, shipping, and delivering propane.

- **Conditioning LP Gas (Propane) Hose Prior to Entering Service (Docket 11297)** concluded that plasticizers are extracted from propane hoses in sufficient quantities to merit consideration of mitigation for quality-sensitive applications. Results showed that conditioning hoses prior to service is technically feasible, simple, and cost-effective.

- **Relief Valve and Cylinder Testing (Docket 10202)** compiled a comprehensive database of relief valve and cylinder performance. Overall, the study found that 20-pound propane cylinders are quite durable, and that the Visual Inspection Method effectively identifies weakened cylinders.

By providing consumers with reliable equipment and a consistent fuel free of contaminants, the propane industry can expect increased opportunities to capture market share in existing markets and lower barriers for entering new markets.

Storage R&D studies tanks, regulators

Understanding tank and regulator performance is key to ensuring safe storage for propane. Three projects investigated key issues in propane storage:

- **Performance, Durability, and Service Life of Low-Pressure Propane Vapor Regulators (Docket 11073)** tested low-pressure propane vapor regulators that had been recently removed from service to develop a database of their performance.

- **Modeling the Performance of ASME Propane Tanks in Fires (Docket 11298)** modeled the response of a propane tank exposed to fire conditions. Results indicated that tanks with a lower design margin had a shorter time to failure, and that relief valve performance is critical to the survivability of lower design margin tanks.

- **Study of Alternative Tank Materials for Underground Storage (Docket 11728)** studied the technical and economic viability of using composites in underground storage tanks. PERC expects a follow-up project to support development and testing of a composite underground tank.

Fact sheets promote R&D successes

**Technical Communications (Docket 11447)** developed a series of fact sheets that promote R&D successes. The fact sheets provide information for both technical and non-technical readers within and outside of the propane industry, and include research goals, key results, and benefits to the propane industry. The fact sheets are available in the R&D section of [www.propanecouncil.org](http://www.propanecouncil.org).
Composite cylinders approved for sale, closer to being accepted for indoor use

Through PERC and NPGA initiatives, two composite cylinder manufacturers received U.S. Department of Transportation exemptions to sell composite cylinders. These high-strength, translucent, fiberglass vessels are lighter than conventional steel tanks.

*Code Approval of Composite Propane Cylinders for Indoor Use (Docket 11643)* tested the performance of composite cylinders in fires. Tests showed encouraging results that allowed the NPGA to propose language to the NPFA that may permit indoor use of composite cylinders in cabinet heaters.

Combined space and water heating systems may increase propane sales by 1.75 million gallons in their first year.

Combined space/water heating unit tested for manufactured housing

*High-Efficiency Integrated Space & Water Heating System for Manufactured Housing (Docket 11110)* built and tested a combination system that uses a propane-fueled hot water heater for space heating/cooling, water heating, and air distribution. The system meets the cost and limited-space requirements of manufactured homes while delivering high energy efficiency and improved comfort. The system, which will be demonstrated in two manufactured homes in 2006, promises a viable product with a ripe market and remarkable benefits.

Combined heat and power, distributed generation demonstrated

Combined heat and power (CHP) systems are a form of distributed generation that use internal combustion prime-power engines to generate electricity while recovering heat for other uses. These systems may provide 5 kW to 800 kW of electricity to support residences and businesses of varying sizes.

- *Design, Testing, and Verification of an Advanced Integrated Energy System at a National Hotel Resort (Docket 10974)* designed and assessed the feasibility of installing a CHP system to provide on-site power with heat recovery at a Marriott resort in Hawaii.
- *Program Finalization for Electric Power Generator (Docket 10646) and Conversion and Demonstration of Ecopower Micro-CHP to U.S. Utility Grid Configuration (Docket 10967)* allowed Marathon Engine Systems to optimize and finalize a propane-fueled, remote power electric generator and micro-CHP product line.
- *All-Propane Off-Grid Residential Demonstration by the Delaware County Electric Cooperative, Inc. and Mirabito Fuel Group (Docket 11777)* demonstrated the value and efficiency of fuel cell power systems with heat recovery in an edge-of-grid residence in New York.
- *Heat Reclam Project (Docket 10565)* supported completion of a demonstration of a propane-fueled reciprocating engine CHP system that provided continuous power to coffee roasting and packaging operations at Green Mountain Coffee Roasters and captured thermal energy for water and space heating.
PERC’s vision is that by 2010 the agricultural industry will recognize propane as a preferred energy source offering exceptional value through product benefits such as cost-effectiveness, efficiency and productivity, reliability, portability, and environmental friendliness.

Poultry house sanitizer reaches commercial marketplace

Propane flame sanitation offers poultry producers an effective, inexpensive way to control pathogens, such as those responsible for avian flu. In the Poultry House Flame Sterilizer / Landscape Flamer (Docket 11391) project, Flame Engineering, Inc. commercialized the technology, bringing the Red Dragon™ to market and presenting it at the 2005 Sunbelt Ag Expo in Moultrie, Georgia.

The Red Dragon uses six liquid propane torches that project 2,000°F flames under a steel hood to kill pathogens such as avian influenza, salmonella, *E. coli*, and coliform. Pathogens cannot become resistant to such extreme heat, which makes propane flame sanitation an effective alternative to standard chemical regimens.

Operating at one-half mile per hour, the poultry house sanitizer consumes approximately 30 gallons of propane to treat a 20,000-square-foot house.

Texas poultry houses cleaned with the Red Dragon during an avian flu outbreak in 2004 reported no reoccurrences in 2005.

Commercialized steam weed control technology arrives in the U.S.

*Thermal Weed Control Technology* (Docket 10644) brought patented propane steam weed control technology from Australia to the United States. In a partnership with D. J. Batchen Pty. Ltd. and Delta Liquid Energy, the Batchen Stinger thermal weed control machine was demonstrated at the 2005 World Ag Expo in Tulare, California, and tested in vineyards in Washington and California after the Expo.

The Stinger uses combusting propane fuel to superheat steam that kills weeds from the outside in without damaging drip irrigation systems. Propane steam weed control is effective and environmentally friendly, and has been accepted by the U.S. Department of Agriculture (USDA) National Organic Program as a recognized organic production practice.

“Using propane to sanitize poultry houses is important for both the poultry industry and the propane industry.”

—Robert Jacobs, Chairman, PERC Agriculture Advisory Committee
Propane-fueled cotton defoliator tests show promise

Thermal Defoliation of Cotton & Chile (Docket 11038) and Harvest Preparation Demonstrations and Tests Using Prototype Thermal Defoliator (Docket 11729) tested a propane-fueled defoliation machine on cotton crops in six locations to determine the effects of thermal defoliation on cotton physiology, yield, and fiber value. The propane-fueled cotton defoliator uses combusting propane to heat air to 380°F and force it through the cotton canopy. The air efficiently transfers heat to kill the leaves while preserving the cotton. Thermally treated cotton can be harvested 24 hours after application, with greater leaf kill (as compared to chemical treatments) and without damaging fiber or yarn properties. Thermal defoliation also suppresses aphid and silverleaf whitefly populations.

If just two percent of the U.S. cotton crop were defoliated using propane-fueled equipment, late-summer propane consumption would increase by 7 to 10 million gallons.

Study reveals agricultural perceptions of remote refueling

Study of Remote Refueling in Agriculture (Docket 11546) explored agricultural producers’ perceptions and attitudes towards propane, refueling equipment for agriculture, and their decision-making process for purchasing such equipment. Producers expressed interest in propane remote refueling technologies and processes that are safe, reliable, quick, cost-effective, and easy to use and understand. The Agriculture Advisory Committee is implementing a strategic plan to address these concerns.
PERC’s vision in engine fuel is to expand propane’s leading alternative fuel position and sales volume by retaining, optimizing, and penetrating existing and new market segments.

“The project shows that today’s propane engines can meet tomorrow’s EPA standards.”

— Tucker Perkins, Chairman, PERC Engine Fuel Advisory Committee

**Forklift fuel study demonstrates commitment to forklift market in meeting 2007 emissions regulations**

Propane is a market-leading fuel for engine-driven forklifts because it supports powerful, durable engine fuel systems that produce fewer carbon monoxide emissions and have lower engine maintenance costs than many gasoline and diesel systems.

After hearing concerns from engine and forklift manufacturers over propane’s ability to meet 2007 U.S. Environmental Protection Agency (EPA) regulations for fuel quality and emissions, PERC began *Investigation of LPG Fuel System Technologies and Fuel Composition Effects on Emissions* (Docket 10951). This critical research project studied the effects of varying propane fuel compositions on emissions and durability, investigated how sulfur affects catalysts, examined the effectiveness of fuel additives, and explored commercial filter use.

Results showed that currently available fuel systems can meet 2007 emissions standards. As the single largest PERC research effort to date, the project clearly demonstrated the industry’s commitment to providing forklift and engine manufacturers with propane systems that will meet future EPA regulations.

**Market studies target key airport opportunities for propane-fueled vehicles**

*Airport Market Analysis: Survey* (Docket 11204) identified domestic airports with the highest market potential and determined engine and vehicle technology needs to fulfill the most promising airport opportunities for propane-fueled vehicles. The study reported that current engines or certified aftermarket technologies can meet the majority of the ground service equipment market’s needs.

*FAA Vision 100 Propane Airport Development* (Docket 11463) began to develop a long-term, nationwide propane airport implementation plan to raise awareness of available propane options for mitigating emissions under the Voluntary Airport Low Emissions Program (VALE).
Propane engine development programs successfully collaborate with manufacturers

Working in partnership with several original equipment manufacturers, PERC is pursuing the development, certification, and commercialization of propane-fueled engines for light-, medium-, and heavy-duty vehicles.

Development of Propane Light-Duty Vehicle (Docket 11942) will design and develop a modified production light truck based on Ford Motor Company’s F-150 pickup truck platform. The truck will use liquid propane injection to meet government regulations and consumer requirements for a practical vehicle that uses propane fuel.

Heavy-Duty Low NOx Hino LPG Truck and Bus Engine (Docket 11553) pursued the development, certification, and sale of a propane-fueled truck engine for the U.S. market. The engine will comply with the EPA’s 2010 emissions standards.

Hino Motor Sales USA Inc., a medium-duty truck manufacturer that is part of Toyota Motors, issued a letter to PERC expressing their interest in commercializing the engine after the development program is successfully completed. The 260-hp engine can provide up to 565 ft.-lb. of torque.

Development and Commercialization of a Propane Blue Bird School Bus (Docket 11943) will develop, test, and market a dedicated propane version of Blue Bird Corporation’s Vision series school bus. The 72-passenger bus represents the model and size with the largest market potential, as identified in PERC’s 2002 study of propane school buses.

Voluntary Airport Low Emissions (VALE) Program

The U.S. Congress established VALE in 2003 to reduce airport ground emissions at commercial service airports located in air quality nonattainment and maintenance areas.

* The National Ambient Air Quality Standards are health standards for lead, carbon monoxide, sulfur dioxide, ground level 8-hour ozone, and particulate matter (PM-10 and PM-2.5). There are no nitrogen dioxide nonattainment areas.

** Partial counties, those with part of the county designated nonattainment and part attainment, are shown as full counties on the map.

Cooperation on pre-competitive R&D is critical to making propane the preferred fuel in a variety of markets. PERC forms partnerships with government agencies, research institutions, propane companies, equipment manufacturers, and industry associations to strengthen technical knowledge and align resources to maximize industry investment.

**Partnerships leverage funding for maximum results**

Since April 2003, PERC has leveraged its investments by pursuing co-funding opportunities with DOE, USDA, the U.S. Department of Defense, and the New York State Energy Research and Development Authority. With an investment of approximately $700,000, PERC has supported projects receiving more than $2.5 million in matching government grants.

**PERC and DOE Clean Cities launch grant partnership program**

In October 2005, PERC and DOE Clean Cities announced the development of a program that provides funds for propane engine development projects including vehicles, infrastructure, and fuel system technology. The program will help support critical research with a limited investment of PERC funding.

PERC and DOE have each contributed $100,000 to the program, which leverages that funding to support six projects representing more than $4.6 million in total research costs. The six projects will install new propane refueling stations, expand local government vehicle fleets to include propane-fueled trucks, develop a propane-fueled commercial mower, develop propane-fueled auxiliary power units for long-haul trucks, add propane-fueled buses to local transit systems, convert National Park System vehicles to run on propane, and install selective catalytic reduction systems on propane-fueled vehicles.

This partnership represents a promising mix of infrastructure and on- and off-road technology development and deployment that can stimulate market growth.

Since its inception, PERC has leveraged federal and state funding to support research in the following areas:

- Engine systems
- Integrated energy systems
- Integrated space and water heating systems
- Micro combined heat and power (micro-CHP) systems
- Off-grid residential power systems
- Propane fuel cells
- Thermal defoliation
PERC signs Memorandum of Understanding with USDA

PERC set an important precedent by signing a formal Memorandum of Understanding (MOU) with the USDA’s Agricultural Research Service (ARS). The MOU allows USDA and PERC to partner on research and technology development projects that overlap their respective missions and are of mutual benefit to USDA and the propane industry.

Potential areas of research include organic farming, non-chemical alternatives to methyl bromide, pathogen reduction, pest and weed control, on-farm distributed energy generation, reduction of greenhouse gas emissions, and remediation of agricultural waste.

USDA awards Conservation Innovation Grant to PERC

The USDA awarded PERC with a $40,000 Conservation Innovation Grant that will allow PERC to partner with the Western Placer Unified School District, which operates a 280-acre farm and 179-acre outdoor learning environment in northern California. The farm is involved in crop and livestock production and teaches agricultural chemistry and biology, natural history, and wildlife research.

This project will provide the school with the Batchen Stinger (a propane-fueled steam weed control machine), a low-emission propane irrigation engine, and an intelligent, remotely accessible moisture measurement and telemetry system for controlling irrigation pump operations.

2005 Partners

In 2005, PERC worked with 36 entities to pursue R&D:

Adept Science & Technologies, LLP
Alaska Energy Authority
Arctic Energy Design & Technical Laboratory
ASCENT
Battelle Memorial Institute
Cal Poly Corporation
Central Coast Vineyard Team Consulting Solutions
Delaware County Electric Cooperative, Inc.
Denali National Park & Preserve
D.J. Batchen Pty. Limited
Dunaway & Cross, P.C.
Energetics Incorporated
Federal Emergency Management Agency
Gaia Power Technologies
Gas Technology Institute
John Deere
Michigan Propane Education & Research Council
Mirabito Fuel Group
Motorola
National Propane Gas Association
National Rural Electric Cooperative Association
New York Power Authority Research & Development
New York State Energy Research & Development Authority
Plug Power, Inc.
Railroad Commission of Texas
Rural Utility Service
Sacred Power
Sandia National Labs Distributed Generation & Energy Storage Programs
ThermDyne
University of Alaska, Fairbanks
University of New Mexico
U.S. Department of Energy
U.S. National Park Service
Xtero Datacom Inc.
Yanmar

Companies: 15
Government Organizations: 10
Professional Organizations: 7
Universities: 4
In 2006, the 10-year anniversary of the Propane Education and Research Act, the research and development mission will continue to seek and leverage co-funding for R&D priorities; build strategic partnerships to advance propane research and development worldwide; explore critical markets for propane fuel and facilitate market entry; and develop, demonstrate, and commercialize technologies that will create new applications for propane and increase propane demand, especially in off-peak months.

**Technology Development**
- Solar power generation systems with propane backup
- Gas cooling technologies
- Composite underground tanks

**Market Entry**
- Pursuit of approval for indoor use of composite cylinders in cabinet heaters
- Engine and vehicle market development to take advantage of tax incentives

**Co-funding**
- Memorandum of understanding with USDA’s ARS
- Grant partnership with the DOE Clean Cities program

**Testing**
- Desiccant dehumidification
- Combined space/water heating systems for manufactured housing
- Thermal cotton defoliation

**Communications**
- Greatly improved research and development content at [www.propanecouncil.org](http://www.propanecouncil.org)

**Partnerships**
- WLPGA/PERC Global Technology Conference
- DOE/PERC transfer of international CHP technologies to the United States
- PERC/USDA transfer of propane alternatives to methyl bromide

The LP Gas Global Technology Conference (GTC) will be held October 19–20 in Chicago, Illinois, in conjunction with the 2006 World LP Gas Forum. Jointly sponsored by WLPGA and PERC, the GTC will gather international speakers to present and discuss innovative technologies that hold real promise for expanding propane’s global market share.

The GTC is the first conference to foster such a global exchange of technical information and ideas. Papers will focus on R&D in the areas of power generation, automotive engine fuel, emerging fuels, residential/commercial uses, industrial applications, agriculture, leisure, operations, fuel quality, environment, and personnel training.

The conference will be chaired by James Rockall, Managing Director, WLPGA; and Roy Willis, PERC President and CEO, and Chairman, WLPGA Global Technology Network.
### Recent Grants

<table>
<thead>
<tr>
<th>Grant ID</th>
<th>Organization</th>
<th>Project Title</th>
<th>Amount</th>
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<tr>
<td>11539</td>
<td>PERC</td>
<td>R&amp;D Project Oversight</td>
<td>$180,000</td>
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<tr>
<td>11643</td>
<td>Battelle</td>
<td>Code Approval of Composite Propane Cylinders for Indoor Use – Phase II - Change Order</td>
<td>$95,000</td>
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<td>11648</td>
<td>PERC</td>
<td>Information Technology: Ongoing Maintenance 2005</td>
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<td>11653</td>
<td>Adept Science &amp; Technologies, LLC</td>
<td>Acoustic Stop-Fill Instrument for LP-Gas Tanks</td>
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<td>11665</td>
<td>PERC</td>
<td>EFCC Operating Support</td>
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<td>11687</td>
<td>National Park Service</td>
<td>Installation and Operation of an Enhanced Off-Grid Solid Oxide Fuel Cell at Exit Glacier, Alaska - Addendum to Docket 10864</td>
<td>$40,000</td>
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<td>11688</td>
<td>PERC</td>
<td>Distributed Generation (DG) Project Development 2005</td>
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<td>11722</td>
<td>AFRED</td>
<td>Using Load Cells To Fill and Monitor Propane Bulk Tank Levels by Weight</td>
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<td>11723</td>
<td>PERC</td>
<td>GMS - 2005 Modifications</td>
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<td>11724</td>
<td>National Park Service</td>
<td>Initial Proposal for Support of a 5kW Continuous Duty Rated Propane Generator at Exit Glacier, Kenai Fjords National Park, Alaska</td>
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<td>11726</td>
<td>NPGA</td>
<td>Extending Bobtail Requalification Period Phase I</td>
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<td>11727</td>
<td>NPGA</td>
<td>Cylinder Vaporization Rates Comparison</td>
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<td>11728</td>
<td>Battelle</td>
<td>Study of Alternative Tank Materials</td>
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<td>11730</td>
<td>John Deere</td>
<td>Proprietary Harvesting Technology</td>
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<td>11777</td>
<td>Delaware County Electric Cooperative, Inc.</td>
<td>All-Propane Off-Grid Residential Demonstration by the Delaware County Electric Cooperative, Inc. and Mirabito Fuel Group</td>
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<td>11793</td>
<td>Energetics Incorporated</td>
<td>Provide Technical Communications Services to PERC’s R&amp;D Advisory Committee</td>
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<td>11795</td>
<td>Denali National Park and Preserve</td>
<td>Install Technically Advanced Propane Generator System at Denali Visitor Center</td>
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<td>11796</td>
<td>PERC</td>
<td>NY Distributed Generation Propane Solar Power Station</td>
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<td>11814</td>
<td>PERC</td>
<td>Solar Generator System with LP Gas Engine</td>
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<td>11826</td>
<td>PERC</td>
<td>LP Gas Global Technology Conference Support</td>
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<td>11836</td>
<td>Dunaway and Cross, PC.</td>
<td>Proposal Regarding Emissions Analysis</td>
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<td>Research and Development Oversight and Advisory Committee Support</td>
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<td>PERC</td>
<td>Yanmar CHP Performance Testing &amp; Field Evaluation</td>
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<td>11871</td>
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<td>Michigan Atarus Stinger Agriculture Research Grant</td>
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<td>11886</td>
<td>Cal Poly Corporation</td>
<td>Development of Technical Information for Growers for the Use of Propane for Steaming as an Alternative to Post-Emergence Herbicides in Orchards,Vineyards, and Vegetables</td>
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<td>11942</td>
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<td>Blue Bird Corporation</td>
<td>Development and Commercialization of a Propane Blue Bird School Bus</td>
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The PERC Grants Management System is available online at [http://www.percgms.com](http://www.percgms.com)
Thank you to the advisory committees who help shape PERC’s R&D agenda.