

PACIFIC GAS AND ELECTRIC COMPANY

CLEAN TRANSPORTATION: FUEL SWITCHING-ADVISORY SERVICES

Student Team:

Madeline Gilleran–EGL (BSE & MSE Mechanical Engineering)

Pauline Park–Master of Business Administration

Vikram Vaidyanathan–Master of Business Administration

Project Sponsors:

Mallik Angalakudati–Vice President of Corporate Strategy

Lydia Krefta–Business Analyst, Principal

Easar Forghany–Business Analyst, Senior

Faculty Advisors:

Matthew Brown–Ross School of Business

Ruiwei Jiang–College of Engineering

Pacific Gas & Electric (PG&E) is a California-based utilities company headquartered in San Francisco. The company provides natural gas and electric services to approximately 16 million people throughout a 70,000-square-mile service area in northern and central California. The state of California has been working with key stakeholders, including PG&E, to achieve goals of reducing greenhouse gas (GHG) emissions in all sectors. Policies put forth to achieve these goals include the Clean Energy and Pollution Reduction Act of 2015, which requires the state to reduce GHG emissions to below 40% of 1990 levels by 2030. Therefore, PG&E is actively considering new growth opportunities that can complement the state's objective of reducing GHG emissions.

In order to identify an appropriate growth avenue, the Tauber team project scope included two phases. The first was to perform a market refresh on a former analysis completed by the PG&E Corporate Strategy team that outlines possible opportunities for PG&E's natural gas business. This market refresh included new analysis of potential market size, drivers and barriers to adoption, regulatory factors, and market trends on the following: hydrogen light-duty vehicles (LDV); medium-duty vehicles (MDV) and heavy duty-vehicles (HDV) fueled by hydrogen, natural gas, or electricity; marine applications; rail applications; fuel cells; propane to natural gas conversions; and micro-CHPs. This phase concluded with a recommendation from the Tauber team to focus efforts on the LDV, HDV, and MDV markets.

Since this conclusion was in line with PG&E's recent focus on alternative fuel vehicles, the second phase of the project came from the internal Clean Transportation Team's work plan. The scope of this phase was to explore fuel switching services within PG&E by mapping the existing process and making recommendations for an ideal future state, addressing electricity, natural gas, and hydrogen as alternative fuels. These services not only include advisory activities such as performing rate analyses but also core utility actions such as service planning to connect infrastructure to PG&E's grid or gas pipelines. Having completed more than 90 stakeholder interviews, the Tauber team created a detailed process map and an accommodating action plan which highlights six focus areas: coordinating and tracking clean transportation projects, continuing to build subject matter expertise, developing future strategic initiatives, marketing clean transportation externally, exploring preliminary siting capabilities, and formalizing the fuel-switching process through a newly developed position and training for existing employees.

Once implemented, this action plan is expected to have significant impact on PG&E's business and the California environment. Enabling the adoption of alternative fuel vehicles, this process improvement could increase PG&E revenue by \$230 million and reduce California GHG emissions by 187,000 metric tons of CO₂ equivalent in 2030, assuming that 10% of adoption will be successful due to these services.