Install Electric Starters

Partner Reported Opportunities (PROs) for Reducing Methane Emissions

PRO Fact Sheet No. 108

Applicable sector(s):

- ■ Production
- ■ Processing
- ■ Transmission and Distribution

Partners reporting this PRO: Enron Corporation, Iroquois Gas Transmission System

Other related PROs: Convert Engine Starting to Nitrogen, Install Instrument Air Systems, Install Electric Compressors

Compressors/Engines	■
Dehydrators	□
Pipelines	□
Pneumatics/Controls	□
Tanks	□
Valves	□
Wells	□
Other	□

Technology/Practice Overview

Description

In the natural gas industry, internal combustion engines for compressors, generators, and pumps are often started using small gas expansion turbine starter motors. High-pressure natural gas is stored in a volume tank while a compressor is running. The pressurized gas is expanded across the starter turbine, initiating startup of the engine, and then exhausted to the atmosphere.

Partners have found that replacing the starter expansion turbine with an electric motor starter, similar to an automobile engine starter, can avoid methane emissions. The technology may include a connection to utility electrical power, site generated power, or solar recharged batteries.

Methane Savings: 1,350 Mcf per year

Costs

Capital Costs (including installation)

□ <$1,000 ■ $1,000 – $10,000 □ >$10,000

Operating and Maintenance Costs (annual)

■ <$100 □ $100-$1,000 □ >$1,000

Payback (Years)

□ 0–1 ■ 1–3 □ 3–10 □ >10

Benefits

Reducing methane emissions was a primary justification for the project.

Operating Requirements

Electric starters require a power supply. Power can be provided from electrical utility, portable and solar-recharged batteries, or generated onsite.

Applicability

This technology is applicable in all sectors of the gas industry.

Methane Emissions Reductions

Conversion to electric starters completely eliminates the venting of methane to the atmosphere and the leakage of methane through the gas shutoff valve. Partners have reported savings of 23 Mcf to 600 Mcf per year, a range that is dependent on how many times compressors are restarted in a year and how readily the engine starts up and stays running. A single startup of a properly tuned engine may require 1 Mcf to 5 Mcf of gas at 200 psig average volume tank pressure, depending on engine size (horsepower). Blowdown valves of a size and pressure differential similar to the gas shutoff valve leak up to 150 scf per hour or 1.3 MMcf per year.

Economic Analysis

Basis for Costs and Savings

Methane emissions savings of 1,350 Mcf per year apply to one engine starter, ten startups per year and methane leakage through the gas shutoff valve.

Discussion

This technology can provide a payback in less than three years. Important economic considerations include the capital cost of installing an electric starter motor, the revenue gained from salvaging the gas expansion turbine starter, and the cost of the electric power needed to drive the motor. The electrical energy required for the new starter will be equivalent to the energy imparted by the gas expansion. Using an electrical power cost of 7.5¢ per kWh, the gas expansion turbine above is equivalent to $1 to $5 per engine start attempt, depending on engine size (horsepower).