

GE Energy

creative energy solutions are in your hands

using coal mine gas
in Jenbacher gas engines



GE imagination at work



coal mine gas as energy source

Coal mine degasification was originally developed to improve worker safety in the mines. The methane-laden mine air, if not captured, is vented to the atmosphere through the use of exhaust fans. In recent years, international studies have determined that 30 – 40% of all coal mines produce gas that can be effectively utilized for power generation with gas engines.

creation of coal mine gas

Coal mine gas (firedamp) is a problematic phenomenon associated with pit coal mining, as the gas can form explosive mixtures together with air. The main component of coal mine gas is methane (25 – 60%), which develops during the geochemical conversion of organic substances into coal (carbonization). Coal mine gas is present both as liberated gas in fissures, faults and pores and as adsorbed gas on the inner surface of the coal and neighboring rock.

three different types of coal mine gas

- coal mine gas from unmined coal seams (Coal Bed Methane/CBM)

CBM consists of over 90% methane and can be harvested independently from coal mining in some locations. The gas composition is normally stable, meaning that the gas can be fed directly into the natural gas network.

- coal mine gas from active mining (Coal Seam Methane/CSM)

CSM is a methane/air mixture released during coal mining and must be ventilated for safety reasons. CSM typically has an oxygen content of 5 – 12% by volume. The methane content ranges from 25 – 60%. However, the methane/air proportion can change suddenly, thus complicating its use in gas engines.

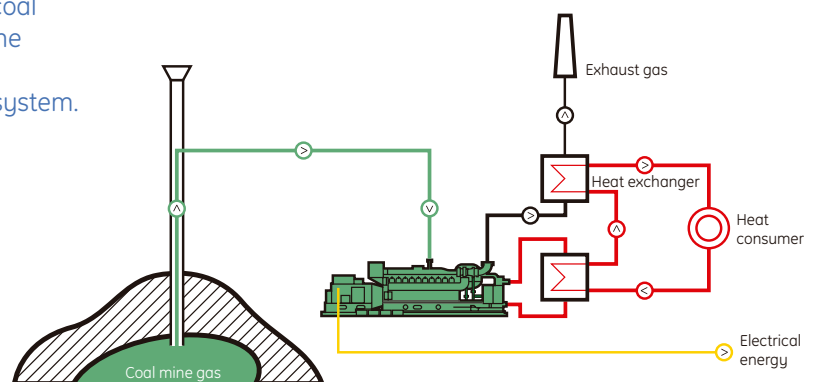
- coal mine gas from abandoned mines (Coal Mine Methane/CMM)

Even after coal mines are shut down, coal mine gas continues to be released. Coal mine gas from abandoned mines typically contains no oxygen and its composition changes slowly. The methane content ranges from 60 – 80%.

the Jenbacher concept

The compositions of CBM and CMM present no technical difficulties with regard to combustion in gas engines. The sudden changes in the composition of coal mine gas from active mining (CSM) place high demands on the engine design; however, Jenbacher offers specially modified gas engines for use with this fuel source.

The electrical energy generated can be utilized in the coal mine for covering electricity requirements or fed into the public power grid. The thermal energy can be used for heating purposes on-site or fed into a district heating system.



advantages

- Alternative disposal of a problem gas while simultaneously harnessing it as an energy source
- Avoiding liberation of methane (CH_4) into the atmosphere. The climate relevant effect (Global Warming Potential, GWP) of methane is 21 times higher than that of CO_2
- Mine gas presents an alternative to conventional fuels
- Highly efficient for on-site power and heat generation
- Operation possible within a wide range of calorific values: With special engine design, the full output can be ensured down to a CH_4 content of 25%, depending on the gas composition
- The highly dynamic output regulation concept of the Jenbacher gas engines using gas regulators, turbocharger bypass and the LEANOX® system allow uninterrupted operation even with relatively rapid changes in the CH_4 content of the coal mine gas
- Depending on the operating time, heat utilization and installation country, the use of coal mine gas in gas engines offers a CO_2 savings potential of approximately 30,000 to 40,000 tons per year and MWe

our competence

The first Jenbacher systems for utilization of coal mine gas were installed in Germany and England in the mid-1980's. Currently nearly 100 units with a total electrical output of over 200 MW for this application are in operation worldwide.



GE Energy's gas engine business is one of the world's leading manufacturers of gas-fueled reciprocating engines, packaged generator sets and cogeneration units for power generation. It is one of the only companies in the world focusing exclusively on gas engine technology.

Jenbacher engines range in power from 0.25 to 3 MW and run on either natural gas or a variety of other gases (e.g., biogas, landfill gas, coal mine gas, sewage gas, combustible industrial waste gases).

A broad range of commercial, industrial, and municipal customers use Jenbacher products for on-site generation of power, heat, and cooling. Patented combustion systems, engine controls, and monitoring enable its power generation plants to meet the strictest international emission standards, while offering high levels of efficiency, durability, and reliability.

GE Energy's Jenbacher product team has its headquarters, production facilities, and 1,000 of its more than 1,250 worldwide employees in Jenbach, Austria.



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