

Solid-Oxide Fuel Cell System

For stationary power generation

The world-leading features of the Rolls-Royce Solid-Oxide Fuel Cell System

Rolls-Royce has experience in the system integration of several different types of fuel cells and believes the Solid-Oxide Fuel Cell is the best for stationary power generation applications while retaining the capability of being developed subsequently for various transportation, military and marine applications.

A fuel cell generates electricity from continuously supplied streams of fuel and oxidant. The two streams do not mix or burn but produce electricity by electrochemical reactions similar to a conventional battery. The details of the chemical reactions depend on the type of fuel cell, but in all types an electrically charged ion is transferred through an electrolyte which physically separates the fuel and oxidant streams. The fuel cell thus provides an elegant means of converting the chemical energy of the fuel directly into electrical energy.



Estimated Dimensions
weight: <20 tons
length: 12.2 M (40ft)
width: 2.3 M (7ft 8.in)
height: 2.6 M (8ft 6.in)

Fact Sheet

Simplicity

The fuel cell is produced by screen-printing on low cost "bathroom ceramic" type materials using proven production processes and minimal exotic materials.

Low Cost

The system uses commercial-grade materials, has few components and is low in weight.

Efficiency

Nearly double the simple-cycle efficiency of existing power generation technologies

Profile

Size and weight suitable for distributed generation with potential for power densities equivalent to gas turbine systems.

Environment

Negligible air emissions, i.e. SO_x, NO_x, CO and particulate matter, minimal noise profile and can be entirely recycled at the end of its useful life.

Maintainability

Unique, modular design enables field change-out without interruption of supply and enhanced support through state-of-the-art diagnostic and prognostic systems.

Safety

System contains less than ten seconds of fuel supply at any time.

Durability

Low parts count and the elimination of low durability components gives a realistic design target of 40,000 hours operation on a mature product and a 20-year 160,000 hour overall plant-life potential.

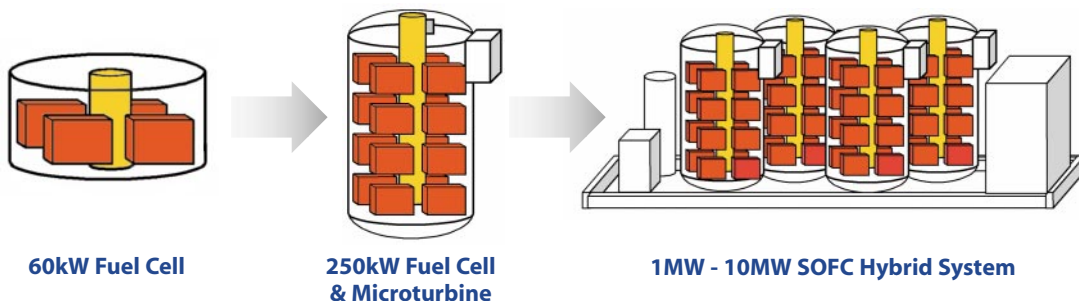
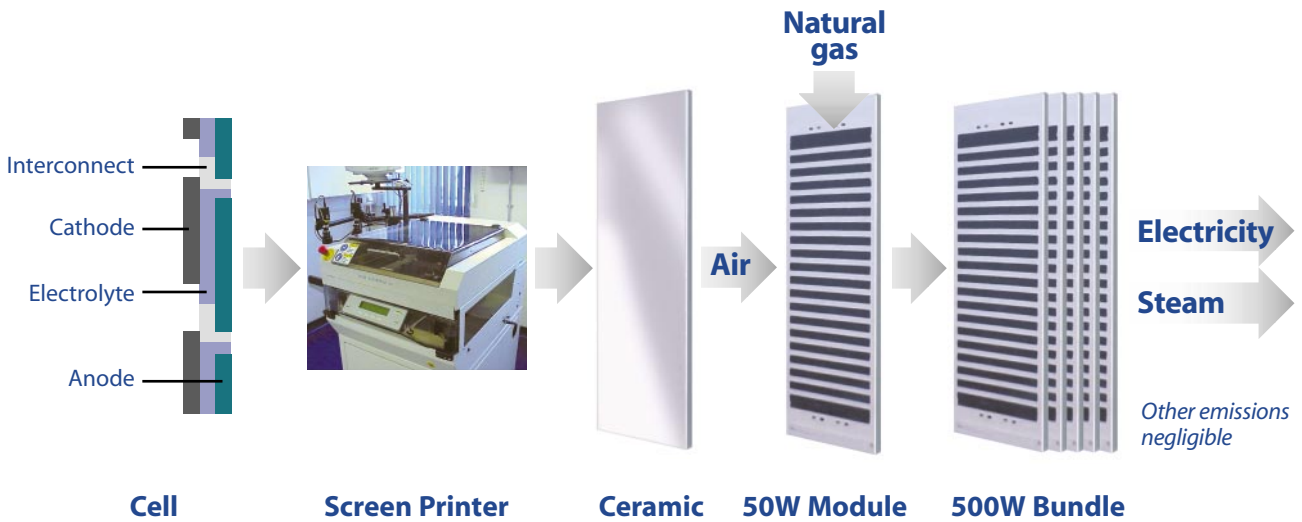
Fuel flexibility

System can be configured to use existing hydrocarbon-based fuels, i.e. natural gas and liquid fuels, and alternative fuels such as coal gas and bio-mass.

Security

Suitable for connection to local distribution networks and in small, secure urban areas.

Summary. *The Rolls-Royce Fuel Cell system is lower cost; more efficient; more easily distributed (standard container size); more durable and maintainable than its nearest rival.*



Rolls-Royce

Rolls-Royce Fuel Cell Systems Limited
PO Box 31
Derby DE24 8BJ, England
Tel: +44 (0)1332 260343 Fax: +44 (0)1332 260412
www.rolls-royce.com

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