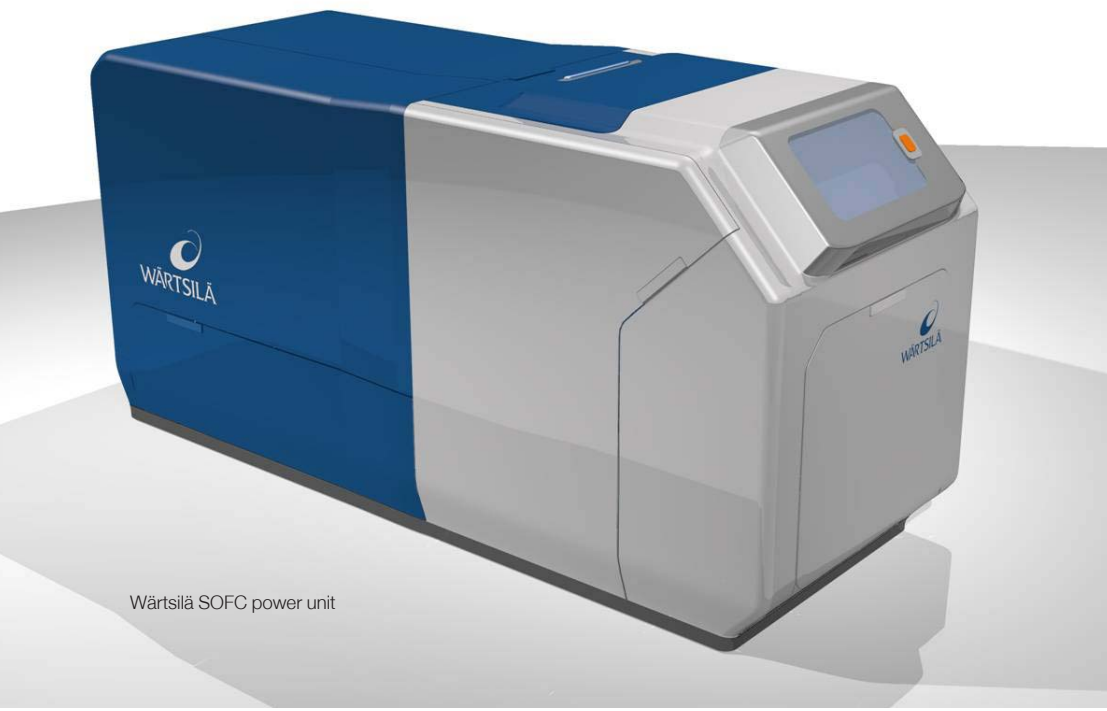
Wärtsilä Fuel Cell Program

Since the year 2000, Wärtsilä has developed fuel cell technology for distributed power generation and marine markets. The present R&D work in Wärtsilä focuses on SOFC system development for commercial and industrial applications.



Wärtsilä SOFC power unit

WÄRTSILÄ

Market Vision

Wärtsilä believes that Fuel Cell technologies will take a significant share of the future energy markets in various power ranges. Wärtsilä is interested in the larger fuel cell applications in a power range of 50 kW to 5 MW to be used in various CHP and marine applications.

Demonstration and pre-commercial markets will develop already during this decade. Commercial mass markets for larger fuel cell applications will exist after year 2010, and a large scale market break through take place at the end of the decade.

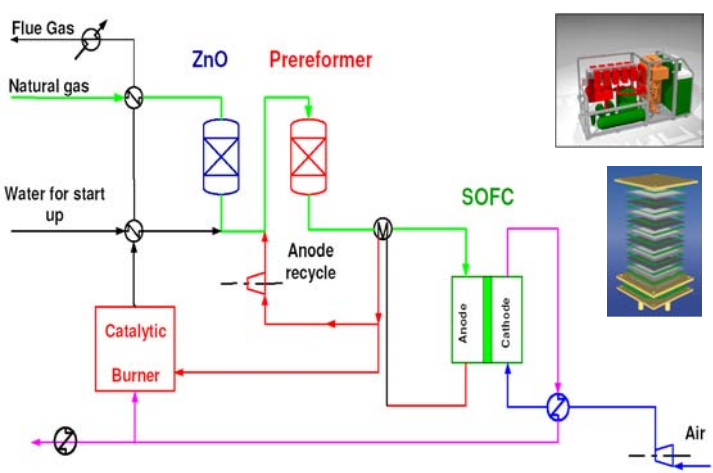
Planar SOFC technology is estimated to take a leading position in stationary power and certain marine fuel cell applications.

Wärtsilä's Role in the SOFC Development

In the R&D work, Wärtsilä concentrates on the design and engineering of fuel cell based power units. System integration of the various technologies included in a fuel cell systems is one of the key areas where Wärtsilä expertise will be utilized. The extensive know-how in Wärtsilä over suitable CHP and marine applications in addition to the know-how over customer requirements for the power units will provide valuable support for the fuel cell development.

SOFC System Description

The present Wärtsilä SOFC system is based on the use of natural gas or methanol, technology for other potential liquid fuel uses is developed later. Basic system diagram is shown in the figure below.



The fuel is de-sulphurized and pre-reformed prior the fuel cell stack. Residual gases are burned in a catalytic after-burner, after which high temperature heat will be recovered.

Wärtsilä co-operates with the Danish technology company Haldor Topsøe A/S in applying their SOFC stack and fuel processing technologies to Wärtsilä power units.

SOFC Applications

Wärtsilä will bring SOFC based power units to stationary CHP and selected marine applications. The former includes commercial buildings like hotels, supermarkets, service stations, data centers etc., and the latter marine APU uses. Extensive software has been developed to adapt a SOFC power unit into customer infrastructure, meet the customer requirements and evaluate the competitiveness and profitability of the application.

SOFC Commercialization

Wärtsilä plans to demonstrate the first SOFC units in different application environments starting by 2007 – 2008, to look into pre-commercial niche applications thereafter, and to commercialise the units in a number of stationary and marine applications since early 2010's

Co-operation

Wärtsilä is making an extensive domestic co-operation with Finnish R&D institutions and potential equipment suppliers, and participates in international co-operation in Europe, the US and Japan in frames of joint development programs and bilaterally with interested companies and institutions.

January 2005

Wärtsilä is The Ship Power Supplier for builders, owners and operators of vessels and offshore installations. We are the only company with a global service network to take complete care of customers' ship machinery at every lifecycle stage.

Wärtsilä is a leading provider of power plants, operation and lifetime care services in decentralized power generation.

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