# Preparation of Abstract for
# 2014 IERE-GDF SUEZ Brussels Workshop
# "Energy at home"

## Micro cogeneration systems using natural gas :

## towards a smart solution !

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Keywords: **micro cogeneration, tests, field tests, fuel cell, stirling, thermal regulation, smart control, peak shaving, electrical efficiency**

Abstract

The micro cogeneration systems using natural gas allow to produce heat and electricity. There are a lot of advantages. These systems allow to reduce the primary energy consumption compared to a classical solution (boiler or electrical heating) . These systems of decentralized electricity production are a solution to relieve the electric grid which is more and more solicited during winter and summer because of the electrical consumption peaks.
The view of GDF SUEZ is that the micro cogeneration products have a high potential for the residential market in particular for individual houses. In this context, GDF SUEZ carries out many laboratory tests and field tests. Today, three technologies are tested : Stirling engine, Internal Combustion Engine (ICE) and fuel cell.
The Stirling mChp, combination of a Stirling module and a condensing boiler, is a mature technology. GDF SUEZ tested several products in his laboratory and has launched 30 field tests since 2011 with different manufacturers (De Dietrich, Baxi, Viessmann..). The obtained results meet the expectations in term of comfort and performances. This product is introduced in the new French thermal regulation 2012.
Currently, GDF SUEZ tests in his laboratory a Japanese ICE product and plans to install two field tests in 2014. These field tests will be a very good opportunity to evaluate the coupling between the ICE module and an existing boiler. Engine mCHP are already commercialized in Germany, where the energy tariffs are favorable to mCHP. Investment cost reduction or other subsidies are needed for a favorable context in France.
The fuel cell is considered as the highest potential micro cogeneration technology because of an excellent electrical efficiency (can reach 60%). GDF SUEZ tested several products in his laboratory (PEM and SOFC) and his objective is to launch quickly these products to the French market. Therefore GDF SUEZ decided to participate to the European project "ENE field which plans to install 1000 fuel cells in Europe. GDF SUEZ will install 28 field tests in France with different manufacturers (BAXI, HEXIS, RBZ, BOSCH, VAILLANT…). This field tests will allow to evaluate the performances, the reliability of the product and to prepare the distribution chain (maintenance, installers, commercial offers..). GDF SUEZ does regulation lobby (installation and safety procedures, ecodesign and new french thermal regulation 2012). The first French field test will be installed in January 2014.
Houses are becoming are more and more insulated, so that the thermal load is increasing, whereas the specific electrical demand increases every year (computers, lighting, cell phones, TV..) : The electrical control is the tomorrow's challenge. GDF SUEZ is convinced that the

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micro cogeneration products are the solutions to reduce the primary energy consumption, to relieve the grid (peak shaving) and will be the solution to reach positive energy house.
In the future, these systems will be compatible with smart control and favor the development of advantageous offers, for example by using an aggregator.
The paper will present field test results on Stirling mCHP, lab test results on engine mCHP and fuel cells. Then, the paper will present the main challenges for mCHP in houses : preparation of the professional network, regulation issues, and economics issues.