



convion

FUEL CELL
SYSTEMS

Erkko Fontell, CEO
erkko.fontell@convion.fi



convion

FUEL CELL
SYSTEMS

Convion

- Convion Ltd. has taken over the Wärtsilä fuel cell development program from 1.1.2013
- Convion will provide fuel cell solution for distributed power generation applications
- By commercializing 50 - 300kW products based on SOFC technology



convion

FUEL CELL
SYSTEMS

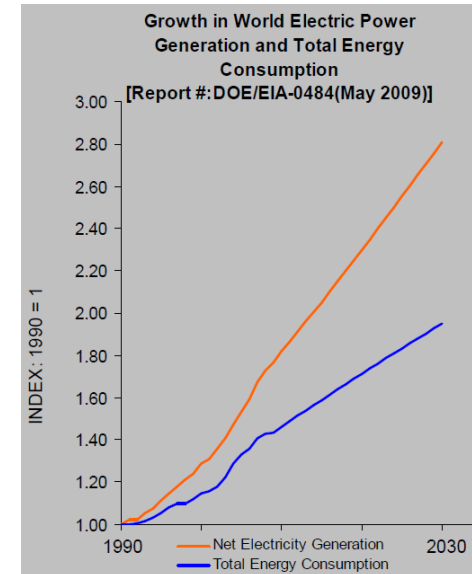
Energy – A global challenge and opportunity

Energy market is changing, 2009 – 2035

- Energy demand + 41%
- Gas consumption + 55%
- Electricity consumption + 180%

Challenges

- Climate change
- Local polutions and health issues
- Power security
- Dependency of fossil fuels



Source: WEO 2011



convion

FUEL CELL
SYSTEMS

Opportunities for clean energy

... If a device can provide

50% better electrical efficiency

Fuel flexibility; Natural gas, Biogas and Hydrogen

Zero NOx, SOx and particulate emissions

Independent and secure power source

... would it have market potential ?



convion

FUEL CELL
SYSTEMS

Convion products fulfill the Need

Efficient, Secure and Sustainable power

- ✓ Scalable power range >50kW
- ✓ Electrical efficiency between 55 – 60% net AC
 - ✓ Total energy efficiency > 85%
 - ✓ Natural gas, Biogas and Hydrogen
- ✓ Zero NOx, SOx and particulate emissions
- ✓ Distributed and independent power source



C50, 50kW fuel cell power unit



3x C50, 150kW fuel cell power unit

Convion Background

- Over 15000h cumulative operating hours on NG, BG and methanol



WFC20 20kWe
α-Prototype
NG
ηe 41%

WFC50 50kWe
Laboratory units
NG, Biogas
ηe ~47%



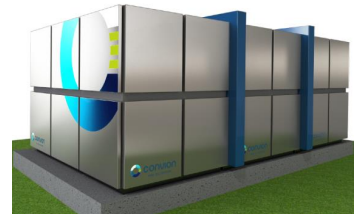
WFC20
NewEnergy
Land fill gas
ηe > 49%

Convion 50 kW
50kW
NG
ηe target >53%



WFC20
Methapu
Methanol
ηe > 43%

Xoo concept
Xoo kWe
NG, Biogas
ηe > 55%





convion

FUEL CELL
SYSTEMS

Convion team



- Convion team has 13 professionals
- Solid track record based on six validated systems
- Unique IPR protected by 38 patented inventions
- 270 man years of experience in SOFC system development

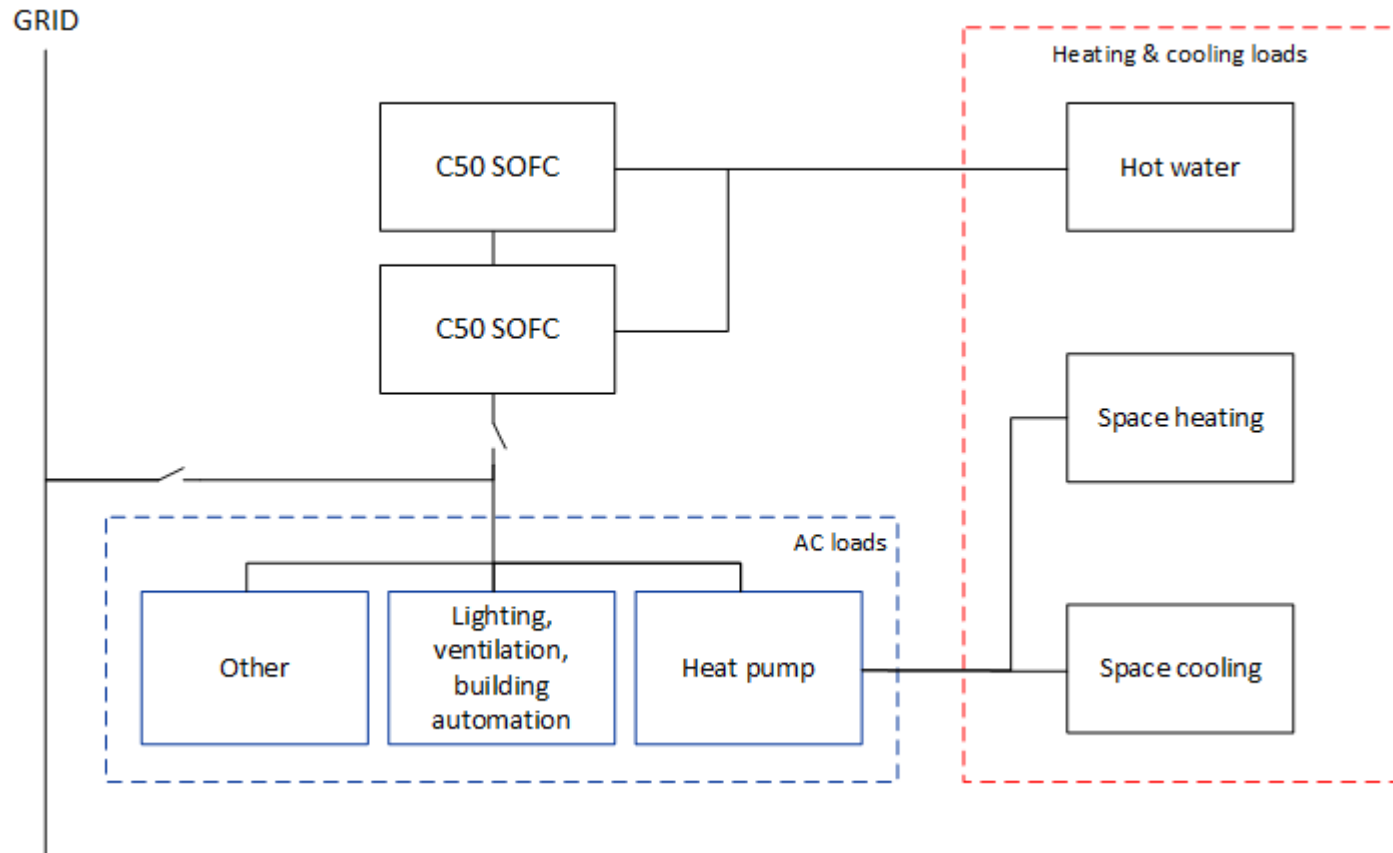


convion

FUEL CELL
SYSTEMS

Case: building integration with high efficiency

- Hot exhaust of SOFC is suited for warming of hot water
- High heat pump efficiency can be achieved when ΔT is relatively low e.g in space heating





convion

FUEL CELL
SYSTEMS

Convion fuel cell combined with heat pump

Heat Pump Performance

Compressor power, kW	29
Heating power, ground heat source, kW	107
COP, EN 14511 0/35 °C	3.7
Cooling power when connected to ventilation, kW	103
COP _c , 12/7 °C, 36/42°C	2.7

- Flexibility between heating, cooling and power supply
- Increased power security for cooling
- Up to 60% reduction in CO₂ emissions compared with district heating



convion

Thank you