



July 2018, NelV



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Viessmann Group

OEM Vision and Requirements – Viessmann Approach to the FC Market

Volker Nerlich, FCH JU, Brussels, 11.10.2018

Presenting Viessmann's approach to the FC market

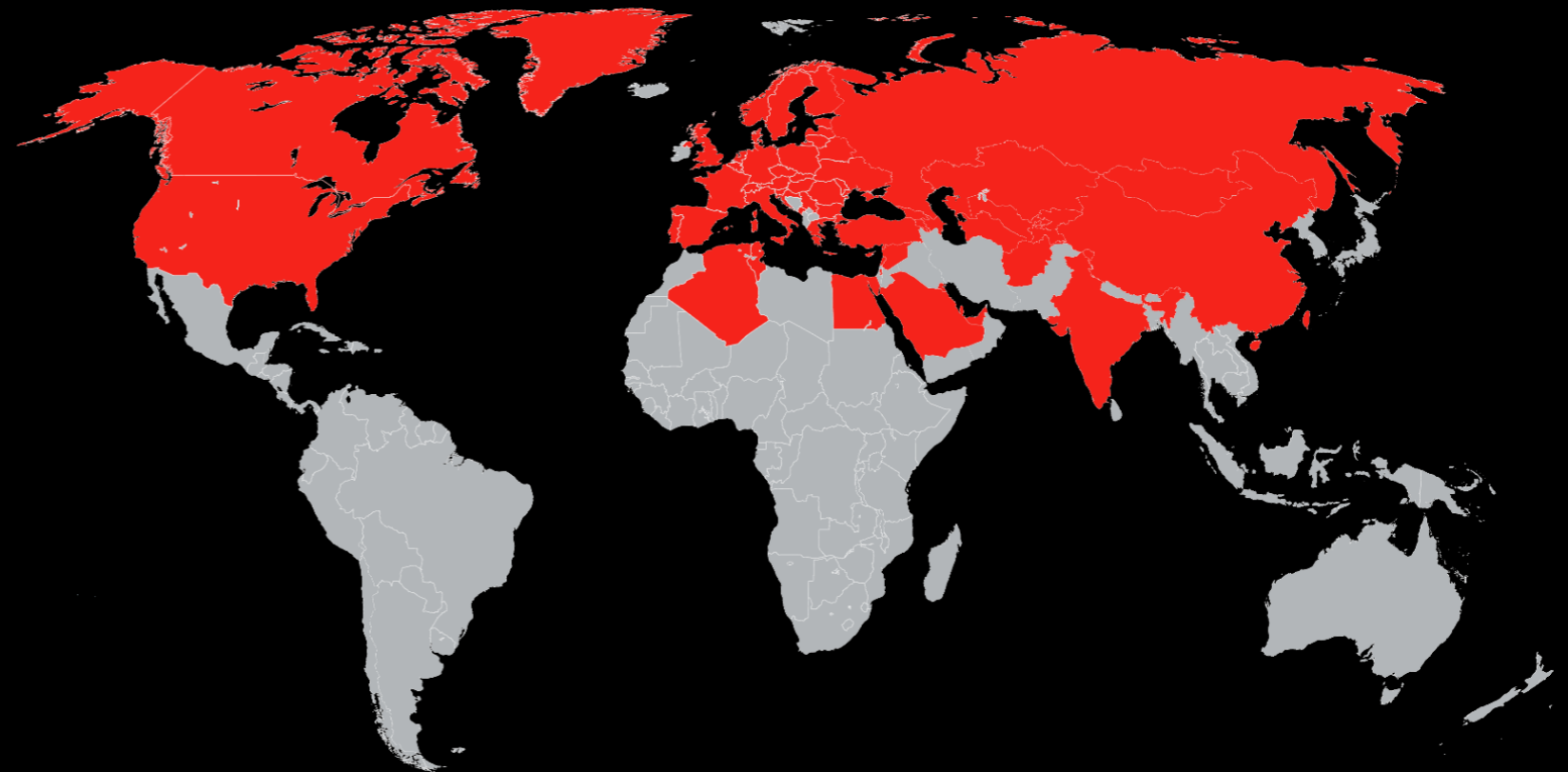


The Viessmann Group



Family business with head office in Allendorf (Eder), Germany

- 1917 Founded
- 12,100 Employees
- 2,37 Turnover in €/billion
- 23 Manufacturing sites in 12 countries
- 74 Countries with sales activities
- 120 Sales offices worldwide
- 55 Export share in percent

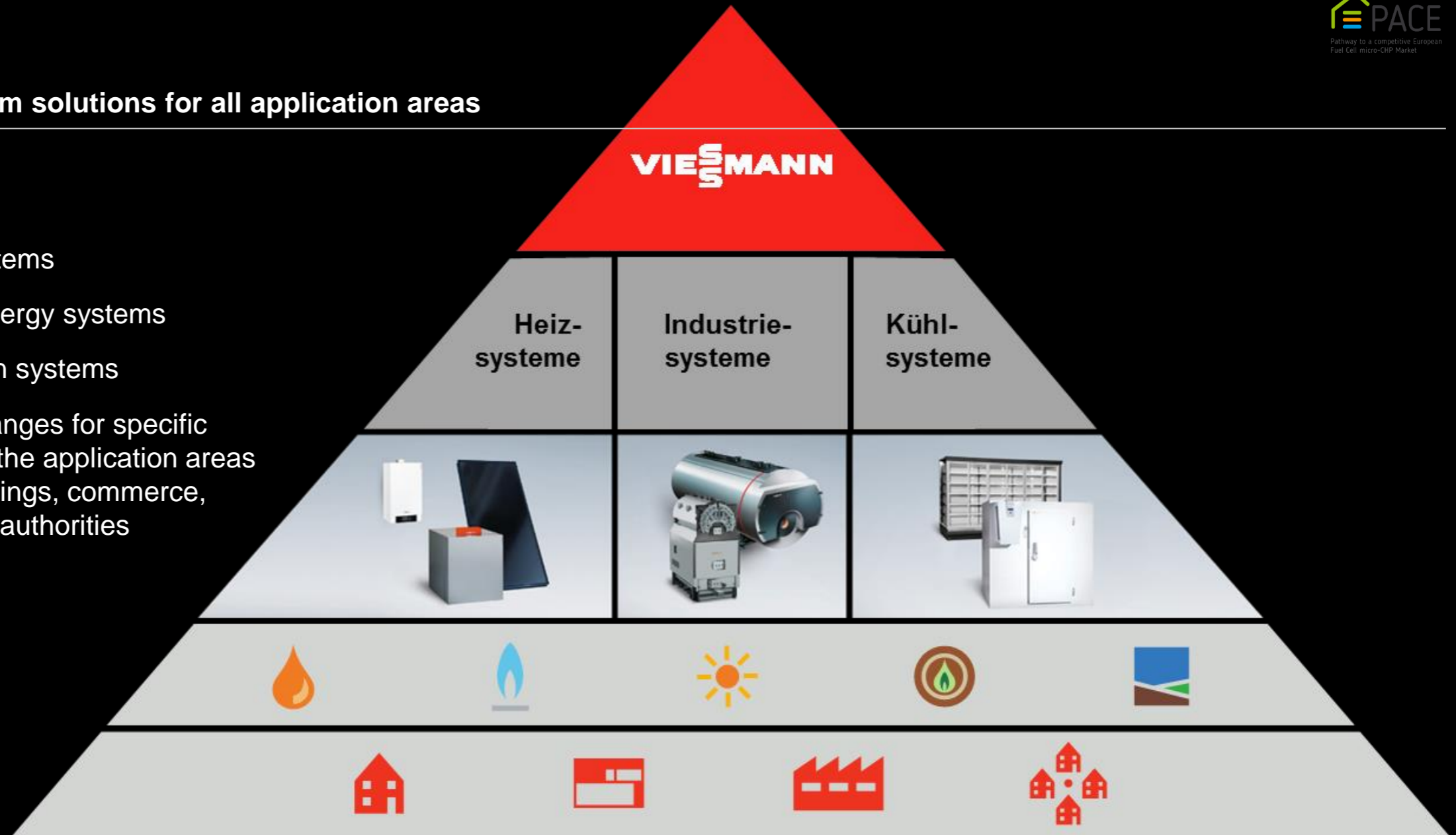


■ Countries with their own sales companies or partners

Comprehensive Product Range

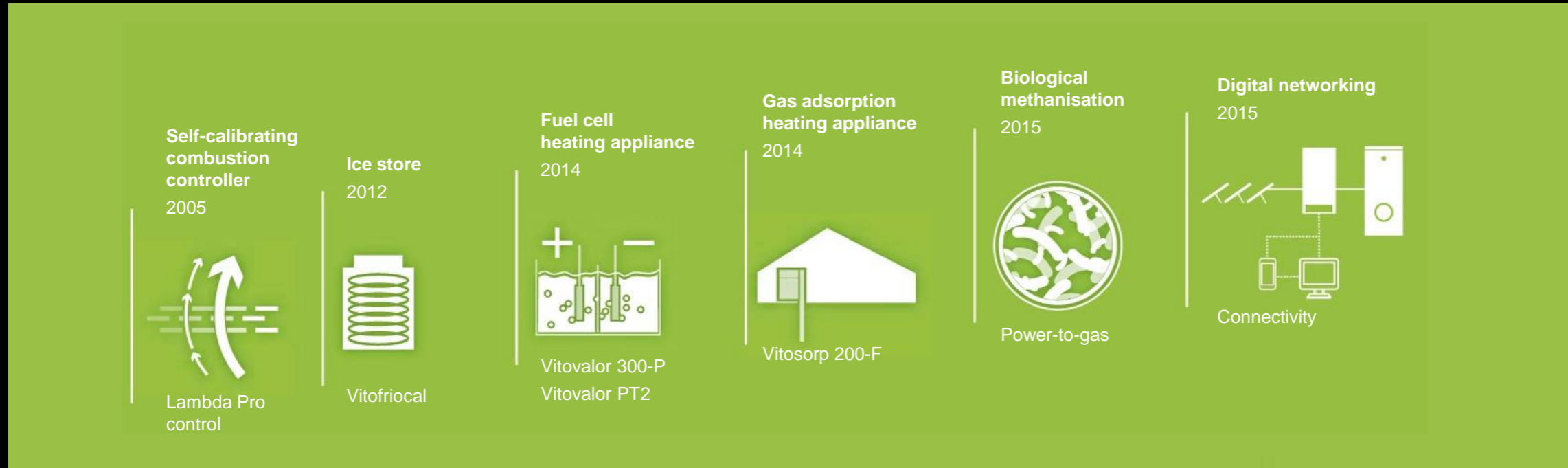
Products and system solutions for all application areas

- Three divisions
 - Heating systems
 - Industrial energy systems
 - Refrigeration systems
- Comprehensive ranges for specific target groups, for the application areas of residential buildings, commerce, industry and local authorities



Innovation

Energy transition solutions



- Raising energy efficiency by more than 132 percent
- Technological leadership in our comprehensive range for renewables, ice store systems and compact hybrid appliances
- Heat and power are converging – efficient technologies with particularly high potential such as the new fuel cell heating appliance
- Digital networking – smart energy management for greater convenience and efficiency
- Research and development expenditure currently at 4 percent of turnover

Arguments for the Cooperation

Viessmann target: Provide a reliable, robust and durable fuel cell system

- I. Complete fc module from one hand
- II. Long term and wide operation experience in market applications
- III. Maximum maintenance interval
- IV. Lowest degradation possible
- V. Highest lifetime possible
- VI. Attractive price potential



Arguments for the Cooperation

Viessmann target: Provide a reliable, robust and durable fuel cell system

- I. Complete fc module from one Japanese manufacturer
- II. Over 130,000 fc systems sold in Japan
- III. 5 years maintenance interval for fc module
- IV. Low degradation over time
- V. 80,000 hours of fc module lifetime
- VI. Attractive price potential!



Product Features

Fuel Cell System Vitovalor PT2

- Fuel cell heating appliance, consisting of
 - Fuel cell module: 750 W_{el}, 1000 W_{el}
 - Peak load boiler: 11, 19, 26, 32 kW_{th}
 - Domestic hot water tank: 220 l
- 3rd fuel cell system generation since launch in 2014
- For single and small multi family homes (new build and refurbishment)
- To generate ~4,500 kWh per year and fulfil the electricity demand of a 4-person-family
- Supplier of fc module: Panasonic, the best possible supplier!



Product Family

Fuel Cell System Vitovalor

Vitovalor is the name of a fuel cell product family, covering all types, sizes and architectures.

- PEMFC (from Japan) and SOFC (from Europe)
- For single and multi family homes as well as commercial applications
- Different architectures to fit to the varying demands of the customers

Other versions to be published on ISH 2019, Frankfurt



Improvement of Vitovalor

Vitavalor specification of different generations

	Gen A (04/14)	Gen B (04/16)	Gen C (04/18)
Gas compatibility	E	E/LL	E/LL
Life time [years]	10	10	12
Possible countries of delivery	DE	DE,UK,FR,AT,CH	DE,UK,FR,AT,CH,BE
Operating hours [h]	60,000	70,000	80,000
Max runtime per day [h]	20	22	24 (up to 45)
Max return temperature [°C]	3 - 40	3 - 50	3 - 50
P_{el} [W]	750	750	750
P_{th} [W]	1,050	1,050	1,100
η_{el} E-Gas [%] Hs	33,4	33,4	33,4
η_{gesamt} E-Gas [%] Hs	80,5	80,5	82,5
Start/Stop cycles	4,000	4,000	4,000
Maintenance interval [years]	2 / 5	2 / 5	5

Cooperation Viessmann and Panasonic



European Fuel Cell product announcement on 9 September 2013

Ceremony with members of German Federal Parliament and German federal ministry of Economic and Energy, German federal Ministry of environment, German federal Ministry of infrastructure and transport and Hessen state government as well as Mr Tsuga, President of Panasonic, Mr. Nakane, Ambassador of Japan and Dr. Martin Viessmann, CEO of Viessmann Group

About 60 members attended



17:00 H.E. Nakane Welcome speech

Ambassador of Japan



17:10 Mr. Tsuga Speech

President, Panasonic Corporation

17:25 Dr. Viessmann Speech

CEO, Viessmann Group

17:40 Product introduction

Mr. Toshiaki IWAI, Director, Smart Energy System Division, Panasonic

Panasonic

VISSMANN

Cooperation Viessmann and Panasonic



Major milestones since Vitovalor launch in 2014

2012: Field test with Japanese fuel cell

2013: Field test with German fuel cell model

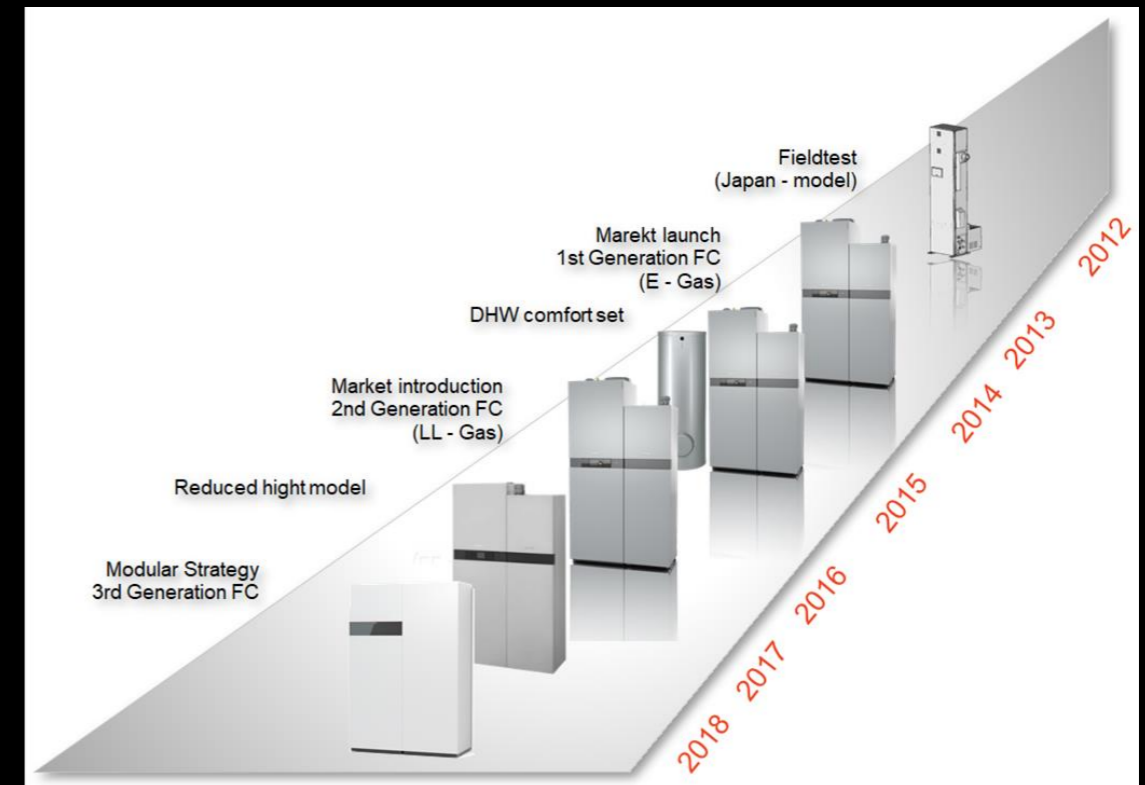
2014: First market introduction only compatible E gas, DE

2015: DHW comfort set for bigger applications

2016: Market introduction of 2nd fuel cell Generation

2017: Reduced height model to fit better in renovation market

2018: Market launch of modular strategy and 3rd Generation of fuel cell



Deployment of Vitovalor



Launch of first fuel cell heating appliance in 2014, for PACE in December 2016

Vi sales branches and target countries

- Germany

and through PACE additionally

- Austria
- Belgium
- France
- Great Britain



Total Sales of

- **more than 2,000 units** until now and
- **more than 5,000 units** in 2020

Deployment especially in PACE

750 Vitovalor as a target

370 Vitovalor have been sold (08.2018)

Challenges

Fuel cell system need to become a standard heating technology

- A** Awareness for the technology
- B** Willingness of end customer to pay though better TCO
- C** Readiness of installer
- D** CO₂ reduction with fossil NG compared to renewables
- E** Administrative effort



Needs

Fuel cell system need to become a standard heating technology

A Higher market pull

B Lower TCO (sales price, feed-in tariff, public funding, ...)

C Higher market pull

D Fairness concerning CO₂ benefit

E e.g. standards for feed-in



Viessmann Perspective



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- Fuel cells are the most effective technology to convert any energy carrier into usable energy for households
 - Though market launch of Vitovalor has been impressive so far, this would not have been possible without significant public funding from E.C., German Government etc.
 - **Viessmann has the best partner to supply a fuel cell module: market experience, lifetime and reliability**
 - Viessmann is caring for the energy transition: Fuel cells are driven with methane, today mainly of fossil origin, tomorrow from renewables via power to gas and biomass



VISSMANN



Pathway to a competitive European
Fuel Cell micro-CHP Market



We create living spaces
for generations to come.