-HEAT PUMP-
Diffusion of the heat pump technology including air conditioning system in next generation

MAY 18, 2016
Daikin Industries, Ltd.
Technology and Innovation Center
Toru INAZUKA

Heat pump is the excellent technology for which an energy efficiencies is very high.

Example of Air to Air Heat Pump
- A compressor is just carrying the energy from outdoor air to indoor air
- If a heat exchanger in an outdoor unit catches the energy of 6, an interior heat exchanger releases the energy of 7
- This case's energy efficiency makes 7
Heat pump contribution to CO2 emissions reduction

Heat pump save about 12.5Gt CO2 in 2050

Reference:
Technology Roadmap (Energy-efficient Buildings: Heating and Cooling Equipment), IEA (2011.5)
Power consumption trend of the room air-conditioner
(cooling capacity 4kw)

COP trend of the VRV air-conditioner
For realization of ZEB

THIC
(Temperature Humidity Individual Control system)

“Humidity control”
DESICA Humidity control Ventilation System

“Temperature control”
VRF operated by high evaporating temperature

Desica Humidity control ventilation system

- High efficiency: About 2.5 times
- Downsizing: 1/3
- No required: supply water and drainage piping
※compared to conventional desiccant dehumidifiers

Internal structure of DESICA

- Adsorbent is directly applied on the surface of the heat exchanger fins
- Low regeneration temperature (40 deg. C)
- Low heat loss, downsizing

Hybrid desiccant Element (HDE)
**ZEB demonstration at Nagoya University**

- **Comparison of power consumption**
  - Advanced AD system
  - Benchmark

- **Comparison of COP**
  - VRF HET
  - Benchmark
  - THIC
  - Benchmark

**ZEB demonstration in Germany**

- **Location**: Herten, Ruhr region, Germany

**Heating**
- Daikin Altherma – Air to Water heat pump with floor heating
- VRV – Air to Air heat pump used for heating

**Cooling**
- VRV – Air to Air heat pump
- Cooling + dehumidification in summer

**Ventilation**
- VAM – heat recovery ventilation
  - Sensible and latent heat recovery

**Lighting**
- Use of LED-technology for night-lighting and spot-lighting

**Power generation**
- Thin film Photovoltaic with 27.3 kWP

**Energy-monitoring**
- Building management system
Remote control Service

- Trouble diagnosis
- Energy saving
- Demand Response

Remote control (Capacity, Setting-temperature, etc.)

Analysis

Operation data (Sensors installed in the Indoor unit/Outdoor unit)

DAIKIN remote control office
Demand Response Demonstration in UK

Consideration regarding the GWP of Refrigerant

R32 is a refrigerant that addresses a range of environmental, safety and economic considerations:

- Zero Ozone depletion potential (ODP)
- Lower Global Warming Potential (GWP) – about one third of R410A
- R32 allows for reduced refrigerant charge, compact design and high energy efficiency
- Easier to charge, recover and reuse because it is not a blend
- Safe to use in many applications because it is an A2L classified refrigerant (low toxicity and lower flammability)

The potential global warming impact (GWP x kg) can be up to 75% less than that of R410A. Energy efficiency can also be improved by 5-10% depending on models.
5.5 million units have already sold in 47 countries (2012~2015)

Effect of Dissemination of R32 (Projection)
Global warming impact from HFCs in developing countries
(Billion tons of CO₂ equivalent)

If developing countries switched from R410A and R404A to R32, the global warming impact would decrease by approx. 46%.

Note: This projection was created based on supporting information from “The large contribution of projected HFC emissions to future climate forcing” Goss. J. M. Veiders et al. The graph shows the effect of converting 50% of R410A usage and 50% of R404A usage to R32.

Thank you!
Evolution of a residential fuel cell unit "ENE-FARM" and challenges for further penetration

May 18th, 2016

Toshiki Shimizu

Panasonic Corporation
Contents

Ⅰ．Advantage of Fuel cell system
Ⅱ．Panasonic’s Latest Development
Ⅲ．Activities for Global Expansion
Ⅳ．Activities for Hydrogen Society
Residential Fuel Cell “ENE-FARM” is a micro combined heat & power system “mCHP” which creates electricity and hot water by chemical reaction with hydrogen and Oxygen.
**Advantage of ENE-FARM**

- **High Energy Efficiency**
  - Thermal Power Plant:
    - Primary Energy: 59% (Source: Law regarding streamline of energy use)
    - Waste Heat & Power Lost During Transmission: 41%
  - ENE-FARM:
    - Primary Energy: 95% Efficiency shown in LHV, shown in ( ) HHV
    - Non-usable Heat: 5%

- **Reduction of CO2 emissions**: 1.3t / year
- **Energy cost saving**: 60,000 yen / year

Equivalent to CO2 volume that beech tree forest of approx. 2,800m² in size absorb
Developed the 4th generation model for market penetration

- Basic technology development
- Development for practical use
- Development for commercialization
- Large-scale field test
- Installation at Prime Minister official residence
- Opening of Kusatsu Factory
- First shipping ceremony
- Commercial sales
- Introduction
- Enlarged introduction
- Penetration
- 15 model Integrated type
- Boiler Separated type
- 09 model
- 11 model
- 13 model + Apartment type
- Panasonic

Government
- NEDO Practical-use Experiments Penetration research project
- NEDO Strategically practical technology development
- NEF Experimental field research
- NEF Large-scale field test project

Industries
- FCCJ (Fuel Cell Commercialization Conference of Japan)
- NEF (New Energy Foundation)
- Promote initiatives with the government & related industries

FCA (Fuel Cell Association)
- Advanced Cogeneration & Energy Utilization Center Japan

Panasonic
2015 model for Detached house

- Two types installation (Boiler integration/Boiler separation)
- Built-in system of continuous power generation at blackout

**Features**

**Fuel Cell Unit**
- Power Generation  700w – 200w
- Heat Generation  1000w
- Overall Efficiency  95.0%
  (Electricity 39%+Heat 56%)
- Durability 70,000 hours
- Dimension 1750(H) x 400(W) x 400(D)
- Weight 77kg

**Hot water Storage tank Unit**
- Back up boiler output 41.9kw
- Water tank capacity 140L
- Dimension 1750(H) x 700(W) x 400(D)
- Weight 88kg (dry condition)
Adoption for Apartment

- New Model for Apartment will be launched in July 2016
- Two types installation (Standard/Exhaust Extension)
- Built-in system of continuous power generation at blackout

Installed example for apartment house

Features

Installation in pipe shaft space
- Improvement of airtightness by thick outer panel
- Integration into one location for several exhaust vent

Specialization for apartment
- Earthquake resistance
- Resistance to wind

Wide variation of installation
- Exhaust variations
- Compact size boiler
- Installation into separated pipe shaft
Activity for “ZEH” (Net Zero Energy House)

- Contribute to reduce the primary energy by ENE-FARM
- Contribute to realize “ZEH” for residential house in urban area which has limited roof space for necessary solar panel capacity

**ZEH sample**

- **(only Solar panel)**
  - Energy Consumption: 62.8GJ
  - Solar panel (5.1kw): -54.1GJ

**ZEH sample**

- **(Solar + ENE-FARM)**
  - Energy Consumption: 62.8GJ
  - ENE-FARM: -10.8GJ
  - Energy saving: -10.6GJ
  - Solar panel (3.9kw): -42.2GJ

(Fuel Cell system)

(estimation by Panasonic)
 Application for ENE-FARM : T-Grid System (*1)

- Micro Grid network within a apartment (190 homes)
- Minimize dependence on electric grid and reduce energy cost for residents
- A key technology for Virtual Power Plant

- ENE-FARM will be installed into all 190 homes.
- Each ENE-FARM will be optimized its operational load so that the total power generation will meet the total power demand.
- Only peak power shortage will be dependent on the existing grid.

Source : TORAY Construction Co., ltd, SHIZUOKA Gas Company  (*1) Micro grid system, T= Town, Team, Trust and Trade
Market expansion in Japan

- Market is growing rapidly since 2009
- Accumulated quantity achieved over 161,000 units in March, 2016
- Cost reduction should be needed because of decreasing the amount of subsidy

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<tbody>
<tr>
<td></td>
<td>5,000</td>
<td>6,500</td>
<td>13,500</td>
<td>24,500</td>
<td>33,500</td>
<td>38,000</td>
<td>40,500</td>
</tr>
</tbody>
</table>

Accumulation Over 161,000 units (March, 2016)

(Units estimation)

Source: Panasonic’s estimation from the summary of co-generation foundation regarding the shipping data between 2009-2014
Viessmann offers the right system solution with heat sources and has well organized sales and customer service system with enough experience in the European market.

Panasonic has established reliability of Fuel Cell business by sales result and technical experience more than seven years as a pioneer of fuel cell system in the Japanese market.

Panasonic has entered into partnership with Viessmann company.
Viessmann and Panasonic developed 1st European Fuel Cell system Vitovalor 300-p launched in April, 2014.

※As of 9th of SEP 2013, residentia PEFC type Fuel Cell system by Panasonic estimation.
Activity for Hydrogen Society

- Acceleration of development for entire value chain such as hydrogen production, storage and application
- Challenge to low cost production of hydrogen and breakthrough of storage technology with low cost and high density

Production of Hydrogen

- Water resolution direct from the sun light
- Water electrolysis with high efficient non precious metal

Application of Hydrogen

- Pure Hydrogen Fuel Cell

Target Specification

- Power : 5kw
- Target Efficiency of Power generation: over 57% (Best in the world)
- Plural FC units connection
Establishment of the Hydrogen Society

Toward the ultimate clean “Hydrogen Society” based on evolution of ENE-FARM and Carbon-Free Hydrogen

- Production of Hydrogen by renewable energy
- Production of Hydrogen by Solar power
- Storage of Hydrogen
- Natural gas ENE-FARM
- Pure Hydrogen ENE-FARM
- Hydrogen Station
- FCV
- Evolution of Gas infrastructure
- Tokyo Olympic
- Spread and evolution of Stationary ENE-FARM
- Introduction → spread and evolution of “FCV”
- Establishment of “Hydrogen Station”
- Evolution of Gas infrastructure: Natural Gas → Hydrogen Infrastructure

Timeline:
- 2000
- 2010
- 2020
- 2030
- 2040
- 2050
Panasonic will contribute comfortable life for the customer and the global environment by the spread and expansion of Fuel Cell.
Fuel Cell Vehicle MIRAI’s Development story & Fascination

May. 18, 2016
Hitoshi Nomasa, Project Manager, MS Product Planning
Toyota Motor Corporation

Toyota’s Work on Environmental Technology Development
Toyota’s Fundamental Approach

Energy conservation

Fuel diversification

Eco-friendly cars contribute to environmental protection when they are widely used

Diverse automotive fuels and powertrains

Primary energy source

- Oil
- Natural gas
- Coal
- Plants
- Uranium
- Hydro, solar, & geothermal electricity generation

Automotive fuel

- Gasoline
- Diesel
- Gaseous fuels
- Synthetic fuels
- Biofuels
- Electricity
- Hydrogen

Powertrain

- Conventional and hybrid vehicles
- PHVs
- EVs
- FCVs
Alternative Fuel - Hydrogen

Advantages of Hydrogen

- Zero CO₂ emissions during use
  ⇒ Helps with the creation of a low-carbon society

- Can be obtained from a variety of primary energy sources
  • It can be made from fossil fuels such as natural gas, as well as from sewage sludge
  • It can be made from water using natural energy sources such as solar or wind energy

- Has a greater energy density than electricity, and is easy to transport and store
  ⇒ It can be used to resolve uneven distribution of regional energy, and to compensate for fluctuations in supply from renewable energy sources

- Can be used for a wide range of purposes
  ⇒ Potential in everything from home use to automobile fuel and power generation
Comparison of Energy Density

Energy Density Per Volume ($\text{Wh/L}$)

Energy Density Per Mass ($\text{Wh/kg}$)

Toyota calculation

The energy density of hydrogen is 7 times more than battery in common use.

Positioning of Hydrogen

Hydrogen supports a sustainable mobility society

“A leading energy source of the future”
FCV’s Mechanism

Run a motor with electricity generated by chemical reaction between hydrogen from a tank mounted on a vehicle and oxygen in the air to drive a car (Clean mechanism without gas emission)
Newly-developed Toyota Fuel Cell system

Improved fuel cell performance and downsizing was realized

Toyota Fuel Cell Stack

New fuel cell stack with increased power density (enhanced performance, downsized)

- **2002 model**
  - Moulded carbon, Straight channel

- **2008 model**
  - Stainless steel, Straight channel

- **New fuel cell stack (MIRAI)**
  - World top level³
  - Volume power density 3.1kW/L

- **Mass power density (kW/kg)**

Rewarded with a smile

TOYOTA
**High Pressure Hydrogen Tanks**

Lighter weight achieved through innovations of carbon fiber reinforced plastic layer structure. World top level*2 tank storage density of 5.7wt% realized.

<table>
<thead>
<tr>
<th>Nominal working pressure</th>
<th>70MPa (approx. 700 bar)</th>
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<tbody>
<tr>
<td>Tank storage density</td>
<td>5.7wt% (world top level*2)</td>
</tr>
<tr>
<td>Tank internal volume</td>
<td>122.4L (front tank: 60.0L, Rear tank: 62.4L)</td>
</tr>
<tr>
<td>Hydrogen storage mass</td>
<td>Approx. 5.0kg</td>
</tr>
</tbody>
</table>

Innovation to the plastic liner configuration and efficient layering pattern resulted in a reduction of approximately 40% in the amount of carbon fiber used.

**Realized improved performance of the high pressure hydrogen tank and cost reduction**

Rewarded with a smile

**Rear End Collision Test (80km/h)**
Hydrogen fueling time: About three minutes

Cruising range: Approx. 650 km
(JC08 Japanese test cycle: According to Toyota measurements)
Approx. 700 km with the new standard stations scheduled for update from FY2016 onward

Short fueling time and long cruising range:
User-friendliness equivalent to gasoline-engine vehicles
– Aiming for reducing total vehicle lifecycle impacts on the environment in addition to during travelling

CO2 index

<table>
<thead>
<tr>
<th></th>
<th>Disposal</th>
<th>Maintenance</th>
<th>Driving (fuel combustion)</th>
<th>Driving (fuel production)</th>
<th>Vehicle, parts manufacturing</th>
<th>Materials manufacturing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline vehicle</td>
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<tr>
<td>HV</td>
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<tr>
<td>MIRAI</td>
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<tr>
<td>Future FCV</td>
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</tbody>
</table>

Future FCV - 70% ca.

Fuel Cell Vehicles are Uniquely Fun to Drive
Low Center of Gravity, Good Front/Rear Balance

Realized a low center of gravity and good front/rear balance by equipping the FC unit below the floor.

High Rigidity Body

- Braces
- Floor cross member
- Motor room cross member
- Rear suspension area
- Stack frame

Torsional rigidity of 40%-60% higher than other Toyota front-engine front-drive vehicles.
Proposal and challenges towards the future mobility society
Make “New values” become “Standard values”

Thank you for your cooperation
The first Fuel-cell-based Micro-CHP in Europe

A successful Japan – German Partnership

Walter Bornscheuer
Viessmann Group

The Viessmann Group
Family business with head office in Germany

1917  Founded
11,500  Employees
2.2  Turnover in billion €
22  Manufacturing sites in 11 countries
58  Countries with Viessmann Sales Presence
120  Sales offices worldwide
56  % International Sales
Heating systems
Efficient technologies for residential buildings and commerce from 1 to 2.200 kW

- Gas and oil condensing boilers
- Combined heat and power systems; world's first fuel cell heating appliance
- Hybrid appliances
- Heat pumps and ice stores
- Wood heating systems (pellets, woodchips, logs)
- Solar thermal systems and photovoltaics, cylinders, system technology and accessories

Energy-political Framework in Germany

- CO₂ - Emissions - 40 % until 2020
- Integration of Solar- and Wind-Power into the Grid
- Stability of the Power-Grid
- Increase of CHP up to 25 % until 2020
- Energy-Efficiency in existing Buildings
Why CHP with fuel cells is useful in residential buildings

**Efficiency:**
High-efficiency, decentralized power generation with almost complete heat utilization

**Climate-friendly:**
50% less CO₂ emissions compared to a separated generation of heat and electricity

**Universal:**
Suitable for almost every building - including new buildings with low heat demand

**Simple:**
CHP to install as simple as a new gas boiler which generates electricity

**Potential:**
14 million in one- and two-family houses in Germany

**Market:**
500,000 gas boilers are sold in Germany every year
Micro CHP
CHP-Solutions, specific for any residential home

New

Old

500 m³ gas / y
4.000 kWh electricity / y

4.000 m³ gas / y
4.000 kWh electricity / y

Heat demand

Power demand

Fuel cell

Stirling engine

PEM

SOFC

Gas Technologies
Product lifecycle, R&D and Innovation

R&D / Test
Introduction
Growth
Maturity
Degeneration
Phase out

Development
Market cycle

Fuel Cell PEM
Micro-CHP Stirling
Gas-Condensing Commodity
Gas-Condensing Premium
Gas-Condensing Floorstanding
Gas-Non-condensing Wallhung
Gas-Non-condensing Floorstanding

Fuel Cell PEM
Fuel Cell PEM

Gas Technologies
Product lifecycle, R&D and Innovation

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Market cycle

Fuel Cell PEM
Fuel Cell PEM

Gas Technologies
Product lifecycle, R&D and Innovation

R&D / Test
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Maturity
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Phase out

Development
Market cycle

Fuel Cell PEM
Fuel Cell PEM
Partnership between Panasonic and Viessmann since 2011

<table>
<thead>
<tr>
<th>R &amp; D</th>
<th>Adaption to European Conditions</th>
<th>System-Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td>Fuel cell-Module</td>
<td>Electronic, User-Interface, Storage Tank, Peak load-Boiler</td>
</tr>
<tr>
<td>Sales</td>
<td>3rd Level Support</td>
<td>Marketing, Sales, Training, Service</td>
</tr>
</tbody>
</table>

History of the Partnership

- **2009**
  - Market-Introduction in Japan

- **2011**
  - Start Partnership Panasonic Viessmann

- **2013**
  - Fieldtests in Germany

- **2017**
  - Limited Market-Introduction
  - Roll-out in Europa
Market introduction in Japan – Success of the “ENE.FARM” program

Since 2009 approx. 150,000 units have been sold by end of 2015

Subsidies for residential Fuel cells in Germany 2016
Currently no nationwide Program for Market Introduction available

- Nationwide Program “Technology Introduction for Fuel cells” (TEP) envisaged, but not confirmed up to now.
- Micro-CHP-Subsidy (3,515,-€) is not sufficient, to convince enough customers buying a Fuel cell
- Only in North-Rhine-Westfalia a temporary program (7,500 €) is currently available
European industry is on its way for market introduction

Thank you for your attention
### Siemens' Challenge:

We realize CO₂ reduction by own & customers

<table>
<thead>
<tr>
<th>Status of CO₂ emission</th>
<th>Major business domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>M t</td>
<td>~50 Gt CO₂ eq</td>
</tr>
<tr>
<td>2.2</td>
<td>25% Agriculture, Forestry</td>
</tr>
<tr>
<td>487</td>
<td>~50% Transportation, Buildings, Industry &amp; other Energy</td>
</tr>
<tr>
<td>~200x Own Operations</td>
<td>~25% Electricity</td>
</tr>
</tbody>
</table>

#### [Action]

- Significant CO₂ reduction at own operation
- Saving at customers by Environmental Portfolio (EP)

#### We are influencing in 75% of Global CO₂ emissions

*1: Annual savings at customers with Environmental Portfolio (EP) products sold in FY15 + total annual savings of products installed since 2002 and still in use in FY15

Global CO₂ emissions: Based on IPP AR5, rounded based on 2010 data
Siemens activities in Japan:
We support CO₂ reduction at Power Generation

Highly-efficient Power Generation:
World Record Gas Turbine

Example:
H-Class Gas Turbine for Kobelco
• In past 25 years, H-Class Gas Turbine has reduced CO₂ 230kt / y with 13.3% emission improvement.
• H-Class is also making world record at Lausward in Germany by >61% net / 85% fuel efficiency

High-technology Wind Turbine:
Direct Drive Wind Turbine

Example:
Eurus Energy
• Higashi Yurihara Wind Firm under construction
• Clean Energy for ~26k householders
• ~ 51kt CO₂ reduction / year = Absorption by 3.7 million of cedar trees

EP Products offer environment-friendly power Generation

*1: Comparison of CCPP by E-class (1990) and H-class (2015)  *2: Based on power generation forecast  *3: Based on 14kg of annual absorption / tree

Japan Wind Power Market:
We need to achieve Renewable Energies affordable

Challenges in cost to bring Japanese Wind Firms globally affordable

Forecast for LCoE*1 (Wind On shore, LCoE basis) *2

Forecast for FIT (Wind On shore) *2

Subjects to be managed to realize competitive renewable energies

Wind firm owner & Manufacturer
• Power Efficiency increase by manufacturers continuously (OPEX)
• Too high Construction cost (60-75% of CAPEX)
• More modernized Wind firm operation by remote control / analysis technology (OPEX)

Government
• Too long & complicated Environmental Impact Assessment (taking 3 – 4 years, too complicated process)
• Too many Laws for Environmental protection (~12 related)
• Too many Laws for land use (~8) & for maintenance (~8)

*1: Leveraged Cost of Energy  *2* Estimation by Siemens KK

Page 3

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### Collaboration: Example of challenges in Japan

<table>
<thead>
<tr>
<th>Subject</th>
<th>Experiences in Germany or EU</th>
<th>Recommendation to Japan</th>
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</thead>
<tbody>
<tr>
<td>Subsidy, Financial incentive</td>
<td>There were / are too many different, fragmented funding schemes on local, state, federal &amp; EU level</td>
<td>&quot;One-stop-shop&quot; for various funds and subsidies</td>
</tr>
<tr>
<td>Law, Regulation</td>
<td>There were / are too many laws / regulations conflicting and complicated</td>
<td>De-regulation &amp; Harmonization of renewable related laws / regulations</td>
</tr>
<tr>
<td>CAPEX</td>
<td>Construction cost is ~ 50% of initial investment (VS 60 – 75% in Japan)</td>
<td>More Competition and Technology development in wind farm construction to reduce CAPEX</td>
</tr>
<tr>
<td>OPEX</td>
<td>Reduction of operation and maintenance cost by centralization operation and remote analytics (20-30% less from Japan)</td>
<td>Application of IoT to Operation &amp; Maintenance (Remote diagnostics, Preventive maintenance etc..)</td>
</tr>
</tbody>
</table>

### New technologies will not be the “Show Stopper” of energy transition

- **Electrification**
- **Automation**
- **Digitalization**

Siemens will work for it and achieve it!

Thank you
The Foundation 2° introduces itself

2° is an attitude.

An attitude of those taking responsibility now – in order to set the course that limits the dangerous effects of climate change.

The companies organised within the Foundation 2° count themselves among those pioneers in climate protection.
2° is an opportunity.

A chance for those who set up their businesses now, to be economically successful in a low-carbon economy of the future.

The companies of the Foundation 2° understand and tackle climate protection as a business opportunity.

Our Organisation

We are...

... a platform for active cooperation. Together, we find answers and solutions to issues of entrepreneurial climate protection.

...set up cross-sectorally – spanning various branches of the economy – to represent a diverse spectrum of the economy.

... a non-profit foundation that works towards climate protection.
Our goals

• Advancement of climate protection and sustainable use of natural resources
• Establishment of a market-based political framework for climate protection
• Strengthening the solution-oriented competence of German companies in the interest of climate protection

Our supporters

• 12 companies
• 200 billion € turnover
• 800,000 employees
Our supporters

Climate protection is top priority.

We are a **CEO-initiative**.

The CEOs of the companies supporting the Foundation 2° identify themselves with the goal of limiting global warming to well below 2°.
Paris means for the economy that...

... the investments in fossil energies will rapidly **decrease**

... projects of a low-carbon economy will be supported by a **better investment environment**

... investments in renewable energies, in measures of climate protection, adaptation and against damages due to climate change will **increase** rapidly

... and politics will further climate protection with **legislative instruments**.

![Foundation 2° on board the "Train to Paris"](image)

**Declaration on Paris**

35 companies declare:

- Paris marks the global turning point
- Companies act as pioneers
- Policy has to lay the political and regulatory groundwork
Our activities

- **Dialogue** with leading political representatives
- **Mediation** between economy and science
- **Best-Practice exchange** und platform for dialogue
- Public relations
- Development of climate protection initiatives

Intensive dialogue between CEOs of the Foundation 2°, Minister of the Environment Barbara Hendricks and scientists on board the “Train to Paris”
On the way to a 2°-economy

The decarbonisation initiative

- Through our business related activities we support the german federal climate goals: 95 percent GHG-Reduction by 2050.
- We prepare our supporting companies with climate strategies for a 2°-economy.

On the way to a 2°-economy

The decarbonisation initiative

- Implementation of interbranch clusters such as mobility, buildings, industrial production, supply chain, smart cities
- The cluster method enables companies to develop solutions and activities with a positive result for the climate
- Self-contained local projects to put climate protection into action are the ultimate goal
Decarbonisation initiative

Mobility Cluster

• What is the need for action for a mobility transition that decarbonises the mobility sector by 2050?
• Which instruments and cooperations can companies use to set up their mobility in a climate friendly way?
• Which political groundwork do they need for this?

Decarbonisation initiative

Building Cluster

• How do we move forward in a transition in the heat sector with regard to the goal of a nearly climate-neutral building sector until 2050?
• What instruments and cooperations can companies use to set up their buildings in a climate friendly way?
• What political groundwork is needed for this?
Thank you for your attention!

Foundation 2° - German CEOs for climate protection
(Stiftung 2° – Deutsche Unternehmer für Klimaschutz)

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