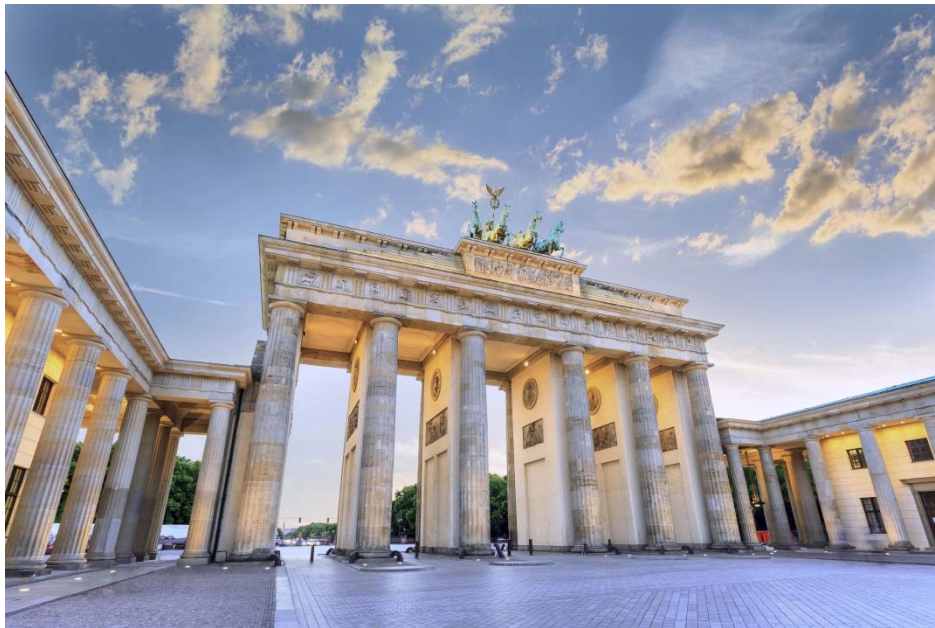


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# International Energy Systems in Transition - Perspectives from Science and Industry - The 15th IERE General Meeting & German Forum



Brandenburg Gate, Berlin, Germany

10 – 13 November 2015  
Berlin, Germany

Organized by  
**IERE, RWE AG and acatech**

Supported by

 VDI  
Wissensforum

5 November 2015

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## International Energy Systems in Transition - Perspectives from Science and Industry -

### About the theme

The 15th IERE General Meeting and German Forum in Berlin will address the technical and strategic challenges arising from the changes in the existing ways of how we convert, transmit and use energy. Although driven by different requirements many countries worldwide are facing an urgent need to adapt their energy systems. Obviously, such massive changes call for more active energy R&D and innovative solutions. Science and industry - each in their individual roles – have to co-operate to develop efficient pathways to an economically viable, sustainable energy supply. A lot of challenges and solutions are not limited to specific regions but affect us globally, thus an international approach is most promising.

Berlin in particular might be a perfect spot for this conference as Germany has taken a leading role on the path from a fossil and nuclear based system to an energy supply based mainly on renewables. Taking into account the impact on business now it's not about copying this model, but finding out what to be learned from all parts of the world, what to be done locally and how to work together in R&D to make successful steps forward.

### Schedule and Venue

#### Tuesday, 10 November 2015

18:00 Welcome Reception

#### Wednesday, 11 November 2015

10:00 The 15th IERE General Meeting & German Forum (Day 1)

19:00 Conference Dinner at a traditional German restaurant

#### Thursday, 12 November 2015

08:30 The 15th IERE General Meeting & German Forum (Day 2)

17:30 Optional guided tour to historical Berlin and Dinner

#### Friday, 13 November 2015

09:00 – 12:00 Optional technical tour to RWE's wood fired CHP plant in Berlin

#### Conference Venue:

Melia Berlin, Friedrichstraße 103, 10117 Berlin, Germany

<http://www.melia.com/en/hotels/germany/berlin/melia-berlin/index.html>

#### For more Information

The Official Website of the 15th IERE General Meeting and German Forum

<http://iere-forum-berlin.com/>

The official Website of the IERE Electric Power Technology Platform

<https://www.iere.jp>

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## Message from IERE Chair

Although driven by different requirements, countries worldwide face an urgent need to adapt their energy systems. Such vast changes call for innovative solutions.

The 15th IERE General Meeting and German Forum: “International Energy Systems in Transition” will address this issue from the perspectives of science and industry.

The 15th IERE General Meeting & German Forum is an excellent opportunity for us to share our experiences, dimension the challenges and discuss the possible solutions for energy systems in transition.

On behalf of IERE, I extend you a cordial invitation to participate in these events. Your personal participation is important, as both the face to face communication, as well as the collective discussions, undoubtedly will provide a fertile ground for new ideas, valuable for every one in the search for solutions to our local problems.

I want to express my sincere gratitude to RWE, acatech and VDI, for their efforts to co-organize and support the 15th IERE General Meeting and German Forum: a great meeting place for an international exchange, from a unique blend of science and industry perspectives.



**Rolando Nieva, Ph.D**

IERE Chair  
IIE, Mexico

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## Message from RWE

The country needs and, unless I mistake its temper, the country demands bold, persistent experimentation. It is common sense to take a method and try it. If it fails, admit it frankly and try another. But above all, try something.  
Franklin D. Roosevelt

Sustainability, security of supply, economic viability and public acceptance – these are the ultimate goals for all energy supply systems. While the underlying conditions such as natural resources, existing infrastructure and political goals may vary greatly from country to country, the necessity and the will to develop the energy system further is common to all. Given the large differences across the regions of the world, it is impossible to provide a universal energy transition blue-print that is applicable to every country. What can be provided is a toolset of technologies and measures that can be used in an individual way to bring about the desired changes.

The challenges arising from unprecedented changes to the way we convert, transport and use energy call for constant technological development. And yet, even the most elaborate R&D efforts cannot be successful without innovative approaches to the way science, industry, government and civil society interact. The 15th IERE General Meeting & German Forum has chosen the headline “International Energy Systems in Transition” to jointly reflect the different options for building our future energy system.

Essential questions to be addressed from the various perspectives of participants begin with the objectives, drivers and challenges of energy transition modes and range from technologies in power generation, transport, storage and energy application to the best forms of collaboration between science and industry. Obviously, we are tackling complex topics which cannot be resolved in a single conference. However, this is an excellent opportunity for experts from science and industry to exchange and broaden their views in an international context, challenge their own positions and establish new contacts for potential follow-up activities.

RWE is delighted to host the 15th IERE General Meeting & German Forum and I am personally grateful for all the preparation work undertaken by IERE, acatech, VDI and the team of RWE R&D. I am sure the key-note addresses, presentations and discussions with international peers will widen participants’ views and stimulate new ideas.

How can R&D enable worldwide transition to new energy systems? I am looking forward to exploring this question with you and, while we are there, proving the truth of an old German saying: Berlin ist immer eine Reise wert – Berlin is always worth a trip.



**Dr. Rolf Martin Schmitz**

RWE AG  
Deputy Chairman of the Executive Board  
Chief Operating Officer

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## Message from acatech

Energy systems worldwide are in need of transition. A significant part of the global population still has no access to clean and affordable energy. As prerequisite for a basic quality of life as well as for economic growth, a secure and sustainable energy supply for everyone is an important development goal. At the same time, anthropogenic climate change – largely the result of our current fossil-fuel-based energy systems – poses a further challenge that needs to be tackled.

Germany's energy transition – the Energiewende – has the aim to reduce greenhouse gas emissions by 80 to 95 percent until 2050. In addition, an important aspect of the Energiewende is the phase-out of nuclear energy within a decade, as recommended in 2011 by the Ethics Committee on "Secure Energy Supply" appointed by the German Federal Government.

Widely as different countries may differ as to the focus and the framework conditions of the energy transition, they agree in one central aspect: To shape the energy system of the future, a sound and well considered transformation path is required, based on a comprehensive understanding and assessment of the complex and dynamic energy system. Research and development play a vital role in developing this knowledge and in paving the way for the transition.

The success of the transition depends on technological and social innovations. Such innovations often occur at the interfaces between different disciplines, topics and perspectives. As academy of science and engineering, acatech strives to create such interfaces, supporting the transfer of knowledge between science, industry and society.

In the project "Energy Systems of the Future", a joint initiative of acatech, the German National Academy of Sciences Leopoldina and the Union of the German Academies of Sciences and Humanities, we develop policy options for the German Energiewende as input for the political and public debate. But the energy transition does not stop at borders: Accordingly, the incorporation of the German Energiewende into a comprehensive European approach was analyzed within the project and identified as a prerequisite for a successful transformation. In our co-operations with other European and international academies of technological sciences and engineering, the energy system also is an important issue.

When IERE and RWE approached me with the request to co-host the 15th IERE General Meeting & German Forum I was both proud and delighted. With this conference, I am pleased to say, we can provide yet another one of those interfaces between different perspectives I have mentioned. Such gatherings of representatives of science and industry from all over the world spawn innovation. I am looking forward to fruitful discussions!



**Prof. Dr. Reinhard Hüttl**

Chairman of the Board of acatech  
and Scientific Director  
German Research Centre for  
Geosciences

Tuesday, 10<sup>th</sup> November 2015

## **IERE Welcome Reception**

(foyer of room Barcelona II)

19:00 – 21:00                      Registration and IERE Welcome Reception

Wednesday, 11<sup>th</sup> November 2015

## **The 15th IERE General Meeting and German Forum – Day 1**

(Room Barcelona II)

09:00 –                              Registration

### Opening Session

10:00 – 10:10                      Opening Address  
*Dr. Gaétan Lantagne (Treasurer of IERE, Canada)*

10:10 – 10:20                      Welcome Address  
*Dr. Rolf-Martin Schmitz (COO, RWE AG, Germany)*

10:20 – 10:40                      Introduction to the German Energiewende  
*Prof. Dr. Reinhard Hüttl (President of acatech, Germany)*

### Keynote Address

10:40 – 11:10                      The pace of the energy transition – a view from industry and science  
*Prof. Dr. Gert Jan Kramer (University of Leiden /Shell Projects & Technology, The Netherlands)*

Wednesday, 11<sup>th</sup> November 2015

(Room Barcelona II)

## “A View on the Energy Transition from different Countries”

### Kick-off-statements as entry to panel discussion

*Moderator: Prof. Dr. Alexander Bradshaw (Max Planck Institute for Plasma Physics and Fritz Haber Institute of the Max Planck Society, Germany)*

11:10 – 11:20 The view from Middle East and North Africa  
*Mr. Paul van Son (RWE Country Chairman MENA & Turkey, UAE)*

11:20 – 11:30 The view from USA  
*Mr. Mark McGranaghan (Vice President, Power Delivery & Utilization, EPRI, USA)*

11:30 – 11:40 The view from Mexico and South America  
*Mr. Fernando Kohrs Aldape (Director of Planning, Strategy Management and Marketing, IIE, Mexico)*

11:40 – 11:50 The view from China: Impacts of large-scale renewable integration on power grid and energy transition  
*Dr. Yao Liangzhong (CEPRI, People’s Republic of China)*

11:50 – 12:00 The view from Japan  
*Dr. Koji Nagano (Deputy Associate Vice President, Director, Socio-economic Research Center, CRIEPI, Japan)*

### Moderated panel discussion on the various transition paths

*Moderator: Prof. Dr. Alexander Bradshaw (Max Planck Institute for Plasma Physics and Fritz Haber Institute of the Max Planck Society, Germany)*

12:00 – 12:40 Discussion

*Panelist:*

*Prof. Dr. Reinhard Hüttl (President of acatech, Germany)*

*Mr. Paul van Son (RWE Country Chairman MENA & Turkey, UAE)*

*Mr. Mark McGranaghan (Vice President, Power Delivery & Utilization EPRI, USA)*

*Mr. Fernando Kohrs Aldape (Director of Planning, Strategy Management and Marketing, IIE, Mexico)*

*Dr. Liangzhong Yao (CEPRI, People’s Republic of China)*

*Dr. Koji Nagano (Deputy Associate Vice President, Director, Socio-economic Research Center, CRIEPI, Japan)*

### Lunch Break (foyer of room Barcelona II)

12:40 – 13:40 Lunch Break

--- poster presentations ---

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Wednesday, 11<sup>th</sup> November 2015

## Parallel Session Ia (room Barcelona II) Next Generation Renewables

*Chair person: Dr. Yongning Chi (CEPRI, People's Republic of China)*

- 13:40 – 14:05            HQ perspectives regarding the renewable/storage market  
*Dr. Gaétan Lantagne (Hydro-Québec Research Institute, Canada)*
- 14:05 – 14:30            Technical practices and the international standardization activities  
of RE grid integration  
*Dr. Yongning Chi (CEPRI, People's Republic of China)*
- 14:30 – 15:00            Sustainable Energy Supply for El-Gouna Touristic City in Egypt  
(Lecture and announcement of a poster presentation)  
*Mr. Peter Shawky, Mr. Mohamed Sabry Abdalla (El-Gouna  
Campus of TU Berlin, Egypt)*

## Parallel Session Ib (room Sevilla) Energy Solutions for Active Customers

*Chair person: Dr. Lioudmila Simon (RWE East, Czech Republic)*

- 13:40 – 14:05            Potentials of industrial demand response management  
*Ms. Victoria Orioli (Siemens, Germany)*
- 14:05 – 14:30            IPv6 based Communication and Information Infrastructure for  
Energy Internet  
*Dr. Wenpeng Luan (CEPRI, People's Republic of China)*
- 14:30 – 14:55            Disruptive Heat Pump Boiler integrated with smart solutions  
*Mr. George Husni (boostHEAT, France)*
- Poster invitations
- 14:55 – 15:00            Commercial conversion of an unused potential - waste heat and  
steam - into electrical energy  
*Mr. Pieter Veltman, Mr. Ewald Schönhals (ENVA Energy, Germany)*

## Coffee Break (foyer of room Barcelona II)

- 15:10 – 15:40            Coffee Break  
--- Poster presentations ---



Wednesday, 11<sup>th</sup> November 2015

Parallel Session IIa (room Barcelona II)

Future Requirements for Thermal Plants

*Chair person: Prof. Dr. Emmanouil Kakaras (Mitsubishi Hitachi Power Systems, Germany)*

- 15:40 – 16:05      Future Requirements for Thermal Power Plants  
*Mr. Jörg Blaurock (ALSTOM Boiler, Germany)*
- 16:05 – 16:30      Energy transition in India - Impact on Thermal Power Operations  
*Dr. Jacob Verghese (STEAG Energy Services India, India)*
- 16:30 – 16:55      Conventional Power Plants in an Electricity Market with a large  
Share of Renewables  
*Dr. Dietmar Keller (RWE Generation SE, Germany)*
- 16:55 – 17:20      Integrating compressed air energy storage into a combined cycle  
gas turbine plant  
*Mr. Nick Lawrence (Isentropic Ltd., United Kingdom)*

Poster invitation

- 17:20 – 17:25      Improving the Flexibility of Thermal Power Plants Using Dynamic  
Simulation - Potential and Practical Examples  
*Ms. Julia Hentschel (Institute for Energy Systems – TU Munich,  
Germany)*
- 17:25 – 17:30      Energy storage combined with flexible power plants  
*Prof. Dr. Emmanouil Kakaras, Ms. Efthymia-Ioanna Koytsoumpa  
(Mitsubishi Hitachi Power Systems, Germany)*

Parallel Session IIb (room Sevilla)

Future Role of Grids and Storage

*Chair person: Prof. Dr. Eberhard Umbach (Executive Board Representative of acatech,  
Germany)*

- 15:40 – 16:05      Adverse effects on the power system stability due to inverter  
power sources increasingly connected to the power system  
*Mr. Masamoto Tatematsu (JEPIC, Japan)*
- 16:05 – 16:30      Reliable, economical and eco-friendly energy transition solutions  
based on hybrid dynamic simulation  
*Mr. Feng Xue (NARI Group Corp. , People's Republic of China)*
- 16:30 – 16:55      Development and interpretation of the Merit order of Energy  
Storage  
*Mr. Christoph Pellingner (FfE, Germany)*
- 16:55 – 17:20      The Implementation of IEC 61850 Smart Substation in Taiwan  
*Mr. Che-I Lin (Taiwan Power Company, Taiwan)*

Poster invitation

- 17:20 – 17:25      Research and discussion on electric vehicles charging cable  
testing methods in different standard systems  
*Mr. Xin Li (NARI Group Corp. , People's Republic of China)*

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Wednesday, 11<sup>th</sup> November 2015

Concluding Session (room Barcelona II)  
Summary of 1<sup>st</sup> day and bridge to 2<sup>nd</sup> day

*Moderator: Dr. Kathrin Goldammer (acatech, Germany)*

Panelists:

- |               |   |
|---------------|---|
| 17:30 – 17:35 | <i>Dr. Kathrin Goldammer<br/>(acatech, Germany)</i>                                       |
| 17:35 – 17:40 | <i>Dr. Chi Yongning<br/>(CEPRI, People's Republic of China)</i>                           |
| 17:40 – 17:45 | <i>Dr. Lioudmila Simon<br/>(RWE East, Czech Republic)</i>                                 |
| 17:45 – 17:50 | <i>Prof. Dr. Emmanouil Kakaras<br/>(Mitsubishi Hitachi Power Systems, Germany)</i>        |
| 17:50 – 17:55 | <i>Prof. Dr. Eberhard Umbach<br/>(Executive Board Representative of acatech, Germany)</i> |
| 17:55 – 18:30 | Panel Discussion  |

Conference Dinner

Restaurant "Lemke"

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|---------------|---|
| 19:00 – 21:00 | Dinner<br>Shuttle service will be provided from/ back to the hotel Melia Berlin |
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## The 15th IERE General Meeting and German Forum – Day 2

Thursday, 12<sup>th</sup> November 2015

### IERE Business Session (room Barcelona II)

*Chair person: Mr. Tetsuo Matsumura (Secretary General, IERE Central Office)*

- 08:30 – 08:45            Chair's Report 2014-2015  
*Mr. Gregory Tosen (IERE Board Member, Eskom, South Africa)*
- 08:45 – 09:00            Report from the Secretariat  
*Mr. Tetsuo Matsumura (Secretary General, IERE Central Office)*

### Session III (room Barcelona II)

#### Examples of Successful joint Science-Industry Co-operation

*Chair person: Prof. Dr. Silke Köhler (Beuth Hochschule für Technik Berlin -University of Applied Science, Germany)*

- 09:00 – 09:25            CO<sub>2</sub> utilization from large-scale industrial point sources  
*Prof. Dr. Robert Schlögl (Fritz Haber Institute of the Max Planck Society and Max Planck Institute for Chemical Energy Conversion, Germany)*
- 09:25 – 09:50            Coordination for the development of technologies and protocols for integrating smart inverters with distribution operations  
*Mr. Marc McGranaghan (EPRI, USA)*
- 09:50 – 10:15            Transformer Insulating Paper Diagnosis: for a Worldwide Application of Methanol as an Innovative Marker  
*Dr. Mariela Rodriguez (Hydro-Québec Research Institute, Canada)*

### Coffee Break (foyer of room Barcelona II)

- 10:25 – 10:55            Coffee Break  
-- Poster presentations ---

### Session IV (room Barcelona II)

#### Strategies to Deal with Framework Set by Policy and Society

*Chair person: Dr. Koji Nagano (CRIEPI, Japan)*

- 10:55 – 11:10            Introduction : Issues and Challenges on the Long-term Energy Supply and Demand Outlook of Japan  
*Dr. Koji Nagano (CRIEPI, Japan)*
- 11:10 – 11:35            Policy and Societal Framework for Energy Sustainability  
*Mr. Alf Henryk Wulf (ALSTOM, Germany)*

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Thursday, 12<sup>th</sup> November 2015

- 11:35 – 12:00      Analysis of possible and cost-effective trajectories for Europe to achieve its medium and long-term climate objectives  
*Dr. Pierre Dechamps (European Commission, Belgium)*
- 12:00 – 12:25      Quality standards for policy advice based on energy scenarios  
*Prof. Dr. Felix Höffler (Institute of Energy Economics - University of Cologne, Germany)*

**Lunch Break** (foyer of room Barcelona II)

- 12:30 – 13:30      Lunch Break  
--- poster presentation ---

**Session V** (room Barcelona II)

**Convergence of Electricity, Gas, Heat and Mobility Systems**

*Chair person: Dr. Frank-Detlef Drake (RWE AG, Germany)*

- 13:30 – 13:55      System foresight at RWE: A multi-scale, sector-integrated approach  
*Dr. Richard Kiefer (RWE Group Business Services GmbH, Germany)*
- 13:55 – 14:20      Linking the German heat and power systems: The potential of power to heat in a future energy system dominated by renewables  
*Prof. Dr. Silke Köhler (Beuth Hochschule für Technik Berlin - University of Applied Science, Germany)*
- 14:20 – 14:45      Short and Medium Term Potential of Power-to-X-Options in Germany  
*Mr. Michael Haendel (Fraunhofer ISI, Germany)*
- 14:45 – 15:10      Green hydrogen: the missing link between the power, gas and mobility systems  
*Mr. Denis Thomas (Hydrogenics, Belgium)*

Poster invitation

- 15:10 – 15:15      “Transition towards an All Electric System” – A Merit Order of Electrification  
*Dr. Serafin von Roon (FfE, Germany)*

**Coffee Break** (foyer of room Barcelona II)

- 15:20 – 15:50      Coffee Break  
--- Poster presentations ---

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Thursday, 12<sup>th</sup> November 2015

## Moderated panel discussion on the various approaches as shown in the sessions

*Moderator: Dr. Kathrin Goldammer (acatech, Germany)*

15:50 – 16:50 Discussion

*Panelists:*

*Dr. Chi Yongning  
(CEPRI, People's Republic of China)*

*Prof. Dr. Emmanouil Kakaras  
(Mitsubishi Hitachi Power Systems, Germany)*

*Prof. Dr. Eberhard Umbach  
(Executive Board Representative of acatech, Germany)*

*Prof. Dr. Silke Köhler  
(Beuth Hochschule für Technik Berlin -University of Applied  
Science, Germany)*

*Dr. Koji Nagano  
(CRIEPI, Japan)*

*Dr. Frank-Detlef Drake  
(RWE AG, Germany)*

## Closing Remarks

16:50 – 17:00 *Mr. Tetsuo Matsumura (Secretary General, IERE Central Office)*

## Social Tour and Dinner

(For participants who have booked the optional Social tour and Dinner)

17:30 – 21:30 Tour to historical Berlin and Dinner at restaurant "Josty"  
Shuttle serve will be provided from / back to the hotel Melia Berlin

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## The 15th IERE General Meeting and German Forum – Day 3

Friday, 13<sup>th</sup> November 2015

For participants who have booked the optional technical tour:

### Technical Tour

- 08:30 Assemble at Melia Hotel Lobby for coach shuttle service
- 09:00 - 12:00 Technical tour to RWE wood fired CHP plant  
12:00 - 12:30 Coffee & Snack
- Coach arranged back to Melia Hotel*
- 13:00 Arrival at Melia Hotel and End of Technical Tour

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### Organizers

#### IERE:

IERE Central Office  
2-11-1 Iwado Kita, Komae-shi, Tokyo 201-8511, Japan  
<https://www.iere.jp>

#### RWE AG:

Corporate Research & Development  
Opernplatz 1, 45128 Essen, Germany  
<http://www.rwe.com>

#### acatech:

Koordinierungsstelle Energiesysteme der Zukunft  
Markgrafenstraße 22, 10117 Berlin, Germany  
<http://www.acatech.de>

### Supporter

#### VDI Wissensforum GmbH:

VDI-Platz 1, 40468 Düsseldorf, Germany  
<https://www.vdi-wissensforum.de>