



igof Indo-German
Energy Forum



GOVERNMENT OF INDIA
MINISTRY OF POWER



Study Tour including a visit of the VGB Congress "Power Plants 2016"

Adaptation of thermal power plants to fluctuating renewable energies

Flexibility Study Tour, September 18–25, 2016, Berlin and Leipzig, Germany

Supported by:

KWS
POWERTECH
TRAINING CENTER

VGB
POWERTECH

PROGRAM OF THE FLEXIBILITY STUDY TOUR

Sunday, 18th September

- Individual arrival
 - Transfer to NH Hotel Kurfürstendamm
 - 18:30 Get-together and briefing in the hotel lobby
 - 19:00 Dinner at the Indian restaurant KABIR
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Monday, 19th September

- 8:00 Check-out from the hotel
 - 8:20 Meeting at the hotel lobby and transfer to the Vattenfall Office, Chausseestr. 23
 - 9:00-16:00 **Flexibility Workshop**
 - 16:30 Departure to Leipzig directly from the Vattenfall Office
 - 18:30 Arrival and check in NH Hotel Messe Leipzig
 - 19:30 Dinner at the Indian restaurant MUMBAI
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Thursday, 22nd September

- 8:45 Meeting at the hotel lobby and transfer to the **VGB Congress** at Congress Center Leipzig
- 9:00-17:00 Individual Participation in the Congress
- 19:30 Dinner at the Indian restaurant INDIAN PALACE



Tuesday, 20th September

- 8:15 Meeting at the hotel lobby and transfer to **Stadtwerke Leipzig**
- 9:00-12:00 Visit at Stadtwerke Leipzig
- 12:00-13:00 Lunch en route
- 13:00-16:00 Visit of the **BMW Group production facility**
- 18:00-21:00 Get-together in the exhibition area of the VGB Congress "Power Plants 2016" including at 19:30 "**India Meet and Greet**" event at the VGB booth



Friday, 23rd September

- 8:30 Check-out at the hotel
 - 9:00 Transfer to Power Plant Lippendorf
 - 9:30-13:00 **Visit at Power Plant Lippendorf**
 - 13:00-15:30 Transfer to Berlin with a stop at a TESLA Supercharger
 - 15:30 Arrival and check in hotel Derag Living Weissensee, Berlin
 - 20:00 Dinner at the Indian restaurant TANDOORI
-

Wednesday, 21st September

- 9:40 Meeting at the hotel lobby and transfer to the **VGB Congress** at Congress Center Leipzig
 - 10:00-16:00 Individual Participation in the Congress
 - 16:00-17:30 Guided tour through exhibition
 - 19:30-23:00 Welcome evening in the context of the Congress at the DA CAPO VINTAGE CAR MUSEUM
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Saturday, 24th September

- 9:00 Transfer to Sightseeing
 - 10:00-13:00 Berlin City Tour
 - 13:00 Goodbye Lunch at the restaurant AMERIT
 - Afternoon for free disposal
-

Sunday, 25th September

- Check-out from the hotel
 - Individual Departure to India
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Dear Participants,

Welcome to Germany, welcome to the cities of Berlin and Leipzig.

You came all the way from India to take part in this special delegation on “Enhancing flexibility of steam power plants to adapt to fluctuating renewable energies” organized by the Excellence Enhancement Centre (EEC) for the Indian Power Sector, the European Technical Association for Heat and Power Generation (VGB) and the Indo-German Energy Forum.

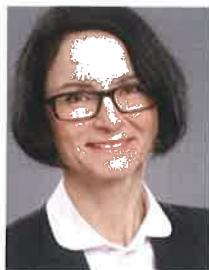
Achieving system stability is key to a successful energy transition towards major shares of renewable energies. Therefore a flexible conventional power plant fleet is essential. Worldwide energy systems transform from centralized and fossil-based to decentralized and renewable focussed systems. With more than 30 % of Germanys electricity consumption being already covered by renewable energy sources especially by wind and solar, the value of flexibility more and more is overruling the value of efficiency in power plants.

This is why in May 2016 Mr. Aniruddha Kumar, Joint Secretary (Thermal), Ministry of Power (MoP), and Mr. Wolfdieter Böhler, Head of Division, Bilateral Cooperation, Federal Ministry for Economic Affairs and Energy (BMWi), decided that the flexibilisation of coal fired power plants to adapt to fluctuating renewable energy generation is a priority issue for the energy dialogue between both countries. Immediately a task force chaired by Director Operations from NTPC Limited, Mr. K.K. Sharma was established. The task force decided to concentrate on the following three aspects (1) study on the technical feasibility of flexibilisation measures in the Indian power sector, (2) to identify requirements for capacity building and (3) analyse the present framework conditions for a flexible operation of conventional power plants.

With this tour program we sincerely hope to give you a broad understanding of these aspects and an insight into the lessons learned from the ongoing energy transition process in Germany. May this program contribute to enable the power sector to integrate larger shares of power from renewable energy sources.

We wish you a wonderful study tour with many unforgettable moments, and an abundance of valuable information.

Kind regards,
Indo-German Energy Forum Support Office



Dr. Claudia Weise is working as a project manager for international projects at VGB PowerTech.

Dr. Claudia Weise
Project Manager
Phone: +49 151 25248343
claudia.weise@vgb.org



Tobias Winter is heading the Indo-German Energy Forum Support Office in New Delhi.

Tobias Winter
Director Indo-German Energy Forum Support Office
Phone: +49 176 34628693
tobias.winter@giz.de



Mr. O.P. Maken is the Chief Executive Officer of the Excellence Enhancement Centre.

Mr. O.P. Maken
Phone: +91 97 17888580176
mdeecips@gmail.com



Jens Jaspert accompanies the delegation as an interpreter. He is fluent in English, German and French.

Jens Jaspert
Interpreter
Phone: +49 179 4977919
jensjaspert@yahoo.com



WORKSHOP

Session 1: Introduction and Welcome

- 9:00 Welcome
Günter Heimann, Vattenfall Europe Generation AG
- 9:10 Special Address
Wolfdieter Böhler, Federal Ministry for Economic Affairs and Energy
- 9:20 Introduction into the Indian Energy Market
Indian Representative
- 9:50 Introduction into the German Energy Market
Dr. Claudia Weise, VGB PowerTech e.V.
- 10:15 Coffee Break
-

Session 2: Experiences in planning and operating flexible thermal power plants

- 10:45 Adapting existing power plants to new market conditions
Günter Heimann, Vattenfall Europe Generation AG
- 11:15 Flexibility of new and optimized fossil fired Power Plants
Dr. Jörg Walter, RWE Technology International GmbH
- 11:45 GKM – Operating a coal fired CHP power plant in an urban area
Dr. Matthias Meierer, Grosskraftwerk Mannheim AG
- 12:15 Lunch
- 13:15 Flexible operation of fossil assets in response to changing markets
Doug Waters, Uniper Kraftwerke GmbH
- 13:45 Flexibility options – from power plant technology to latest storage solutions
Dr. Dirk Schettler, STEAG Energy Services GmbH
- 14:15 Coffee Break
-

Session 3: Training of power plant personnel

- 14:45 Training strategies and concepts for power plant personnel
Horst-Günther Stürenburg, Team Co-ordinator Simulator Training, Kraftwerksschule e.V.
- 15:15 Flexibility: how to adapt to new requirements – training approach and practical insights
Horst-Günther Stürenburg, Team Co-ordinator Simulator Training, Kraftwerksschule e.V.
- 16:00 Closing Remarks
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LEIPZIGER STADTWERKE



At a glance:

- Medium-sized utility that managed the transformation from an old socialistic-centralistic power and distribution plant to the largest provider of electricity in the State of Saxony, Germany
- Power generation, distribution, load management and dissemination of renewable installation/generation
- Scheduling, balancing, energy forecasting
- Gas, district heating, solar generation, biomass

Brief description:

In terms of turnover, Stadtwerke Leipzig GmbH (SW Leipzig), is one of the largest municipal utilities in Germany. This municipal utility and energy service provider pursues a multi-utility approach. On its home market, SW Leipzig is the market leader in a growing city, thanks to efficient and environmentally friendly power generation. As part of the company's operations in Poland, the subsidiary GPEC is the market leader in the supply of heating to the region around the northern Polish city of Gdansk. SW Leipzig is a wholly-owned subsidiary of LVV Leipziger Versorgungs- und Verkehrsgesellschaft mbH, Leipzig (LVV).



“India Meet and Greet” at the VGB Congress “Power Plants 2016”

An “India Meet and Greet” event is organized in the context of the Get-together at the VGB Congress aiming at a prominent exchange of experiences on the Indian and the European energy market. Speakers from India (Ministry of Power, Excellence Enhancement Centre and NTPC) and from the VGB (Dr. Bernhard Fischer, Chairman of the VGB-Board; Dr. Oliver Then, Head of Power Plant and Environmental Technologies of VGB) will talk about areas of energy co-operation between India and Germany.



BMW Production Facility



At a glance:

- A modern car manufacturing facility by BMW
- Visit of the Electric Vehicle production of BMW i3 and i8

Brief description:

More than 850 premium standard BMW vehicles are produced at the Leipzig plant with the aid of highly qualified employees and innovative production technology. Each BMW automobile is individually produced and tailor-made to the client's wishes and preferences. Several thousand parts in many different colours and sizes and thousands of production stages are necessary before the vehicle is ready to start what is often a long journey to the client. Every traditional BMW vehicle built in Leipzig passes through pressing plant, body shop, paint shop and assembly. A sophisticated logistic is vital for the whole production system. It takes less than 40 hours to build a BMW in Leipzig, including many rigorous quality checks, because quality is the key focus of all associates and processes at the BMW Leipzig Plant.

“POWER PLANTS 2016”

VGB PowerTech e. V. is the European technical association for power and heat generation. Since its foundation in 1920, VGB has become the technical centre of competence for the operators.

www.vgb.org

21/22 September 2016
in Leipzig/Germany

VGB CONGRESS

Power Plants 2016
with technical exhibition

www.vgb.org

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10:00–11:00 CONGRESS OPENING WITH WELCOME SPEECHES OF:

Dr. Bernhard Fischer, Chairman of the Board of VGB PowerTech e.V.

Dr. Hartmut Mangold, State Secretary, Saxon State Ministry of Economic Affairs, Labour and Transport

Uwe Albrecht, Mayor and Deputy for Economy and Labour, City of Leipzig

11:00–12:30 PLENARY SESSION: “NEW HORIZONS:
NAVIGATING THE POWER INDUSTRY IN TIMES OF CHANGE”**The role of energy supply in the industry 4.0**

Dr. Jörg Rothermel, Member of the Management at the German chemical industry association VCI – Verband der Chemischen Industrie e. V.

Change management in connection with industry transformation processes

Jens Baier, Boston Consulting Group, Germany

Discussion

12:30–14:00 Lunch

14:00–16:00 “FUTURE ENERGY SUPPLY WITHOUT FOSSIL FUELS?”

Chair: Sonja van Renssen, ep energy post, Belgium

Decarbonisation as a future duty!

Dr. Karsten Sach, Head of the Department “Climate Protection Policy, Europe and International”, Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, Germany

National emission reduction = global climate protection?

Dr. Frank Umbach, Research Director of the European Centre for Energy and Resource Security (EUCERS), King’s College, United Kingdom

Security of supply – “Cinderella” of the European energy transition?

Hansten Berge, EURELECTRIC, Belgium

Panel Discussion**Topical issue: The VGB Initiative Hgcap**

Dr. Oliver Then, Head of Power Plant Technologies, VGB PowerTech e.V.

16:00–17:30

**GUIDED TOUR THROUGH THE EXHIBITION**

The following companies provide insights into activities in the Indian Market: GE, DURAG, Siemens, STEAG, VPC, and Wallstein

19:00–23:00 WELCOME EVENING AT THE DA CAPO VINTAGE MUSEUM

Networking event to interact with other Congress participants in the special atmosphere of the former casting house

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The VGB-membership is open for companies and institutions active in the power business. 488 members in 35 countries – over 90 percent are European based – represent an installed of 461 gigawatt based on a broad energy mix and covering all sources of electricity production.

The VGB Congress is the most important event of the association.

Individual participation in the Congress

9:00–12:00 CONGRESS SECTION A: INTEGRATION OF RENEWABLES

Wind farms without subsidies: Challenges and risks for the operator

José Ángel Diaz Alvarez, EDP Renováveis S.A., Spain

The contribution of Alpine hydropower towards a reliable, sustainable and efficient European power transition

Andreas Stettler, Dr. Nicolaus Römer, Johann Herdina, Peter Matt and Herfried Harreiter, Association of Alpine Hydro power Operators (AGAW), Austria

Integrating renewable power plants with battery storage

Riccardo Amoroso, ENEL Green Power, Italy

Large scale storage options under special consideration of 6 x15 MW battery example

Dr. Wolfgang A. Benesch, STEAG Energy Services GmbH, and Christian Karalis, STEAG GmbH, Germany

Peaking plant Bayonne (New Jersey): A flexible solution to support a volatile grid

Shawn Picard, Ethos Energy Group PPS, USA, and Tobias Aschoff, Siemens AG, Germany

ALTERNATIVE CONGRESS SECTION B: NEW BUILD INVESTMENTS

Please refer to the official VGB Congress program

12:00–13:30 Lunch

13:30–17:00 CONGRESS SECTION C: ASSET OPTIMISATION & ENVIRONMENTAL PROTECTION

Implications of the new BREF-LCP/BAT conclusions

Dr. Klaus-Dieter Tigges, Chairman of the EPPSA Technology Committee, EPPSA a.i.s.b.l., Belgium

Meeting the BREF limits – Technological solutions for new and existing plants

Dr. Matthias Jochem, Mitsubishi Hitachi Power Systems Europe, Germany

Improving merit order position by reducing start-up costs

Gerhard Heinz, GE Power AG, Germany

Overview on measures to increase flexibility in existing coal fired power plants and economic assessment

Udo Gade, Vattenfall Europe Generation AG, and Jörg Böwe, Mitsubishi Hitachi Power Systems Europe, Germany

Converting CFB boilers from coal to 100% biomass combustion

Jan Žižka and Ludvík Pavlík, ČEZ Inženýring, s.r.o., Czech Republic; Hynek Lang, ČEZ, a.s., Czech Republic

ALTERNATIVE CONGRESS SECTION D: COMMERCIAL OPTIMISATION

Please refer to the official VGB Congress program

POWER PLANT VISIT



LIPPENDORF POWER PLANT

**At a glance:**

- Installed capacity: 1,840 MW
- Net efficiency: 42%
- Fuel: Lignite
- Start of operation: 1999
- Location: 15 kilometers south of Leipzig

Brief description:

The first unit was connected to the grid in June 1999 for the first time, the second connection to the power system followed half a year afterwards. With an investment volume of approx. 2.3 billion Euros, the new construction project of Lippendorf power plant was the largest private project in the Free State of Saxony realized after 1990.

Standards have also been set in the field of environmental protection. In comparison with the specific emissions of the old plants (the reference year is 1990), the following reductions could be reached for each kilowatt hour supplied to the power system: by 44.6% for carbon dioxide, by 99% for dust, by 98% for sulphur dioxide and by 73% for nitrogen dioxide.

About Vattenfall:

Vattenfall Europe Generation AG is a power utility owning lignite power plants with a capacity of about 8 GW in the eastern part of Germany. Vattenfall Europe Generation AG belongs to Vattenfall AB, the state owned power utility company in Sweden. Beside the lignite portfolio Vattenfall operates power and heating facilities based in wind, hydro, nuclear, biomass, coal and gas in the core markets Scandinavia, Germany and Netherlands.

www.vattenfall.de

Other important technical power plant data:**Unit**

Rated capacity (gross): 920 MW

Steam boiler

Number: 1 each – Once-through forced flow

Steam output: 2,420 t/h

Live steam pressure: 267.5 bar

Live steam temperature: 554 °C

Turbine

Number: 1 each

Construction: Five-cylinder condensing turbine

Generator

Apparent power: 1,167 MVA

Nominal voltage: 27 kV

Cooling tower

Number: 1 each – Natural draught wet

Height: 174.5 m

Cooling water flow: 84,600 m³/h

Flue gas cleaning

Dedusting: Electrostatic precipitator

Denitrification: By primary measures at the firing system

Desulphurisation: Unhydrated lime wet washing process



IMPORTANT ADDRESSES DURING THE STUDY TOUR

HOTELS:

Berlin, Sunday 18th September

NH Berlin Kurfürstendamm****
Grolmanstrasse 41-43, 10623 Berlin

Leipzig, Monday 19th to Friday 23rd September

NH Messe Leipzig ****
Fuggerstrasse 2, 04158 Leipzig

Berlin, Friday 23rd to Sunday 25th September

Derag Living Weissensee****
Parkstrasse 87, 13086 Berlin

VGB-CONGRESS:

Congress Center Leipzig
Seehausener Allee 1, 04356 Leipzig

Welcome Event on Wednesday 21st, September

DA CAPO VINTAGE MUSEUM
Karl-Heine-Strasse 105, 04229 Leipzig

RESTAURANTS:

Berlin, Sunday 18th September

KABIR
Carmerstrasse 17, 10623 Berlin-Charlottenberg

Leipzig, Monday, 19th September

Mumbai
Nikolaistrasse 16, 04109 Leipzig

Leipzig, Thursday, 22nd September

Indian Palace
Nikolaistrasse 12-14, 04109 Leipzig

Berlin, Friday 23rd September

Tandoori
Bizetstrasse 121, 13088 Berlin

Berlin, Saturday 24th September

Amrit Potsdamer Platz
Ebertstrasse 14, 10117 Berlin



ABOUT THE INDO-GERMAN ENERGY FORUM

Established in 2006 by the Indian Prime Minister and German Chancellor in order to promote energy dialogue, with the aim of intensifying and deepening Indo-German co-operation in the areas of: Energy Security, Energy Efficiency (EE), Renewable Energy (RE), Investment in energy projects, Collaborative research and development. The IGEF Support Office has a liaison function to all interested stakeholders of the IGEF and is facilitating the dialogue on all levels.

The high level steering committee of the IGEF, also called "Forum", takes place annually and provides a platform for high-level policy makers and representatives from industry, associations, financial institutions and research organisations from both India and Germany.

On a working level, thematic sub groups have been created which convene meetings on a regular basis:

- Efficiency Enhancement in Fossil Fuel Based Power Plants
- Renewable Energies
- Demand-Side Energy Efficiency and Low Carbon
- Growth Strategies.
- Green Energy Corridor and Grid Management

Within the sub groups, several task forces have been set up to devise and implement specific cooperation projects, such as the Excellence Enhancement Centre for the Indian power sector or the development of an energy performance assessment tool for residential buildings. Additional task forces concerning further topics may be created at the initiative of representatives of the relevant government agencies, private sector and other experts.

The German Ministries (BMZ, BMUB and BMWi) and government agencies (GIZ and KfW) have partnered in the energy sector with Indian ministries (MoP and MNRE), Indian government agencies (BEE and CEA) Indian financial institutions (IREDA and NHB), Indian utilities (NTPC), and various Indian state governments.

Apart from this, notable cooperation efforts have been made between the Indian and German educational institutions and private sectors. All of them are the stakeholders of the IGEF apart from the private sector from both countries.

The IGEF Support Office (SO) provides liaison services for all stakeholders. It identifies possible topics for the IGEF dialogue and supports private-sector projects. It serves as a first point of contact both to the Indian and German governments as well as companies seeking to get involved in the process. Moreover, the IGEF-SO answers queries regarding proposals for the IGEF dialogue or IGEF projects and any other subject relevant to the private sector.

The Support Office has offices in New Delhi and Berlin to liaise between all participants in the IGEF process.

The Support Office can be reached at the following addresses:

NEW DELHI

Indo-German Energy Forum - Support Office
1st Floor, B-5/2, Safdarjung Enclave
New Delhi 110 029, India
Phone: +91 11 49495353

BERLIN

Indo-German Energy Forum - Support Office
c/o Deutsche Gesellschaft für Internationale
Zusammenarbeit (GIZ) GmbH
Köthenerstrasse 2,
10963 Berlin, Germany
Phone: +49 30 338424462

**E-Mail: info@energyforum.in
www.energyforum.in**



Indo-German
Energy Forum



**Deutsche Gesellschaft für
Internationale Zusammenarbeit
(GIZ) GmbH**

**GIZ India
B 5 / 1, Safdarjung Enclave
New Delhi, 110029, India
Phone +91 11 49495353**

**Excellence Enhancement Centre
Wing No.5, 1st Floor
West Block-II
R.K. Puram, Sector-I
New Delhi-110 066, India
Phone: +91 11-26164297
www.eecpowerindia.com**

**VGB PowerTech e. V.
Deilbachtal 173
45257 Essen, Germany
Phone: +49 201 81280
www.vgb.org**