গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
বিদ্যুৎ, জ্বালানি ও খনিজসম্পদ মন্ত্রণালয়
বিদ্যুৎ বিভাগ
বাংলাদেশ জ্বালানি ও বিদ্যুৎ গবেষণা কাউন্সিল (ইপিআরসি)
বিদ্যুৎ ভবন, ১ নং আব্দুল গণি রোড, রমনা, ঢাকা।
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সচিব	● সভায় উপস্থাপন করুন
একান্ত সচিব	● বর্তমান অবস্থা সম্পর্কে অবহিত করুন
ব্যক্তিগত কর্মকর্তা	● .....তাং এর মধ্যে ব্রীফ দিন
	● আলোচনা করুন
	স্বাক্ষরঃ
স্বাক্ষরঃ	তারিখঃ 22/8/16

বিষয়ঃ **ফ্রান্স এবং স্পেনের বিদ্যুৎ ও জ্বালানি বিষয়ক বিভিন্ন গবেষণা সংস্থা ও বিশ্ববিদ্যালয় পরিদর্শন, প্রশিক্ষণ এবং অর্জিত অভিজ্ঞতা সম্পর্কিত প্রতিবেদন।**

উপর্যুক্ত বিষয়ের আলোকে জানানো যাচ্ছে যে ইপিআরসির একটি প্রতিনিধিদল গত ১২/১১/১৭খ্রিঃ তারিখ হতে ১৬/১১/১৭খ্রিঃ তারিখ পর্যন্ত ফ্রান্স এবং স্পেনের বিদ্যুৎ ও জ্বালানি বিষয়ক বিভিন্ন গবেষণা সংস্থা ও বিশ্ববিদ্যালয় পরিদর্শন, প্রশিক্ষণ এবং অভিজ্ঞতা অর্জন করেন। এ সংক্রান্ত একটি প্রতিবেদন এতদ্‌সঙ্গে সংযুক্ত করে পেশ করা হলো।

22/8/16
(ফারহান হোসেন)
নির্বাহী প্রকৌশলী
বাংলাদেশ জ্বালানি ও বিদ্যুৎ গবেষণা কাউন্সিল

✓ চেয়ারম্যান (সচিব)
বাংলাদেশ জ্বালানি ও বিদ্যুৎ গবেষণা কাউন্সিল

ICT officer
22.08.16

Report on Experience Sharing and Training Programs at Different Energy and Power Research Institutes in France and Spain

Preface

A delegation from Bangladesh Energy and Power Research led by Shahin Ahmed Chowdhury, Chairman (Secretary in Charge), EPRC visited different research institutes on energy and power with a view to participating in experience sharing and training programs in France and Spain. Mr. A.K.M Humayun Kabir, Joint Secretary of Power Division, Mr. Tanmoy Islam, PS (Senior Assistant Secretary) to the Chairman of EPRC, Mr. Farhan Hussain, Executive Engineer of EPRC, Mr. Samsul Arefin Khan, Deputy Manager of BEPRC, Mr. Nafiz Ahamed, Assistant Manager (Finance) of EPRC and Mr. Golam Faroque Khan, Sub-Assistant Engineer of EPRC were the other members of the delegation. During the 5 (Five) days long program arranged by the EPRC, the delegation visited Electricity of France (EDF), CentraleSupelec University, Polytechnic University of Madrid (UPM), Gas Natural Fenosa (GNF) and Comillas Pontifical University.

Purpose of the Visit:

(1) To identify avenues for interaction and collaboration with energy and power research institutes as well as Universities in France and Spain to solve critical and emerging industry issues.

(2) To gain access to a comprehensive, timely, high-value R&D portfolio on energy and power.

(3) To create a network with industry peers in France and Spain for driving technology innovation in the context of Bangladesh.

(4) To help shape the direction of EPRC strategy, future plans and research focus areas.

(5) To understand the current and future applied research trends in the field of energy and power.

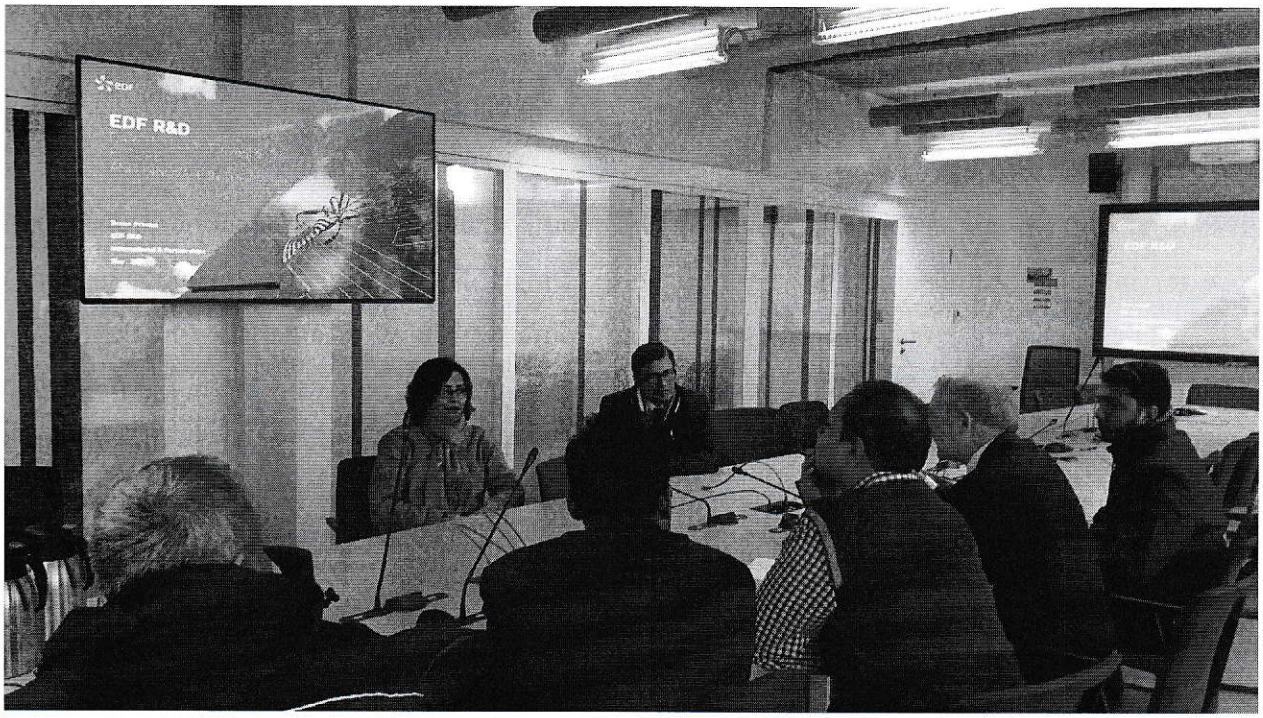
Visit to Electricity of France (EDF)

Brief Description of Electricity of France (EDF):

As a global leader in low-carbon energy, the EDF Group covers every sector of expertise, from generation to trading and transmission grids. EDF builds on the expertise of its people, its R&D and engineering skills, its experience as a leading industry operator and the attentive support of its customers to deliver competitive solutions that successfully reconcile economic growth with climate protection.

Meeting With the Representatives from Electricity of France (EDF):

The EPRC delegation had a meeting with representatives from Electricity of France on December 12, 2017 at 10:00 A.M. in Saclay, Paris. The team from EDF was led by Jacques Sacreste, Director, International and Partnerships, Electricity of France.



The following discussions and consequent decisions were taken between the EPRC delegation and the EDF team:

1) The innovation hub of EDF has created an international network for locating innovative startup companies. The aim is to support the most high-performance startup companies and put them in contact with EDF Group entities or subsidiaries so that tests can be carried and then-if they prove successful- business partnerships can be created. The EDF team told the EPRC delegation that the innovation hub teams of EDF can open their doors to Bangladesh and work in close collaboration with startups to identify and implement new methods or technologies to revolutionize the energy sector.

2) The innovation hub of EDF also provides support for Intrapreneurship which is to develop ideas that emerge internally and to turn them into startups. The EDF team suggested the EPRC delegation that a program similar to that of Intrapreneurship can be carried out by the Council. It can provide necessary support to take the innovative ideas developed by individuals or teams within the organizations under the Ministry of Power, Energy and Mineral Resources from the drawing board right through to market launch.

3) ITech, the Technology Transfer Institute was created in 1998 at the request of the R&D Division at EDF. It is a specialist training organization within the EDF Group, and provides a space for information transmission, sharing, and exchange. The goal of the organization is to share practices, expertise, and innovations resulting from research work undertaken by the R&D division at EDF. There are 23 training courses available to professionals working in the fields of energy and power. The EDF team told the EPRC delegation that the Council can provide necessary support to the prospective researchers and professionals on energy and power in Bangladesh so that they can participate in the training programs of ITech.

4) As today's increasingly digital world dramatically changes the way electricity is produced and consumed, research into power generation, transmission and consumption is of decisive importance. To succeed in the energy transition and benefit from future innovations, more than 2,000 EDF's R&D division employees (representing 27 nationalities) are currently working on many different projects designed simultaneously to deliver low-carbon power generation, smarter energy transmission grids and more responsible energy consumption. EDF has a total of 45 R&D services and solutions. The EDF R&D catalogue is available below:

https://www.edf.fr/sites/default/files/Lot%203/CHERCHEURS/Actualites/catalogueretd-en.pdf

The EDF team told the EPRC delegation that the Council can have access to its R&D support and solutions to meet its applied research needs on energy and power as well as to find solutions to major research challenges. They also mentioned that no membership fees are required for access to EDF R&D facilities however service fees are applicable.

Visit to the Laboratory of Industrial Engineering (LGI) at CentraleSupelec

Brief Description of Laboratory of Industrial Engineering (LGI), CentraleSupelec:

The Chair on Systems Science and the Energy Challenge (SSEC) within the Laboratory of Industrial Engineering (LGI) at CentraleSupélec is supported by the European Foundation for New Energy of Électricité de France (EDF). It recruits students with excellent analytical skills

through a national competition, after two years of intensive training in fundamental science (maths, physics, etc.) and also delivers engineering degrees at the Master of Science and PhD levels. CentraleSupélec shares a strong record in terms of academic research and have strong connection with the industry.

Meeting With the Representatives from Institute for Research in Technology:

The EPRC delegation had a meeting with representatives from CentraleSupélec on December 13, 2017 at 14:00 P.M. in Saclay, France. The team from CentraleSupélec was led by Professor Enrico Zio, Chair Systems Science and the Energy Challenge, European Foundation for New Energy.

The following discussions and consequent decisions were taken between the EPRC delegation and the CentraleSupelec team:

(1) CentraleSupelec team develops new methods, frameworks and modeling architectures, techniques and algorithms, for the safety and risk analysis of complex engineered systems, based on a systematic and complete viewpoint. The range of application includes Industrial systems like renewable energy systems, electric power grids, smart grids, nuclear power plant

components, oil and gas systems, automotive and railway transportation systems. The aforesaid research focus areas of CentraleSupelec are similar to that of EPRC. The CentraleSupelec team suggested that EPRC should have a methodical and holistic approach to its research focus areas. It should put in place a strong system for coordinating applied research work on energy and power as well as have a multidirectional focus capable of viewing the problem of energy and power system in the country from different perspective.

(2) The CentraleSupelec team told the EPRC delegation to arrange an International Conference every year in Bangladesh. The Conference should focus on the objectives and milestones set by the Council on applied research work in the field of energy and power, how to address the emerging issues in the research focus areas of the Council and to come up with innovative as well as viable ideas.

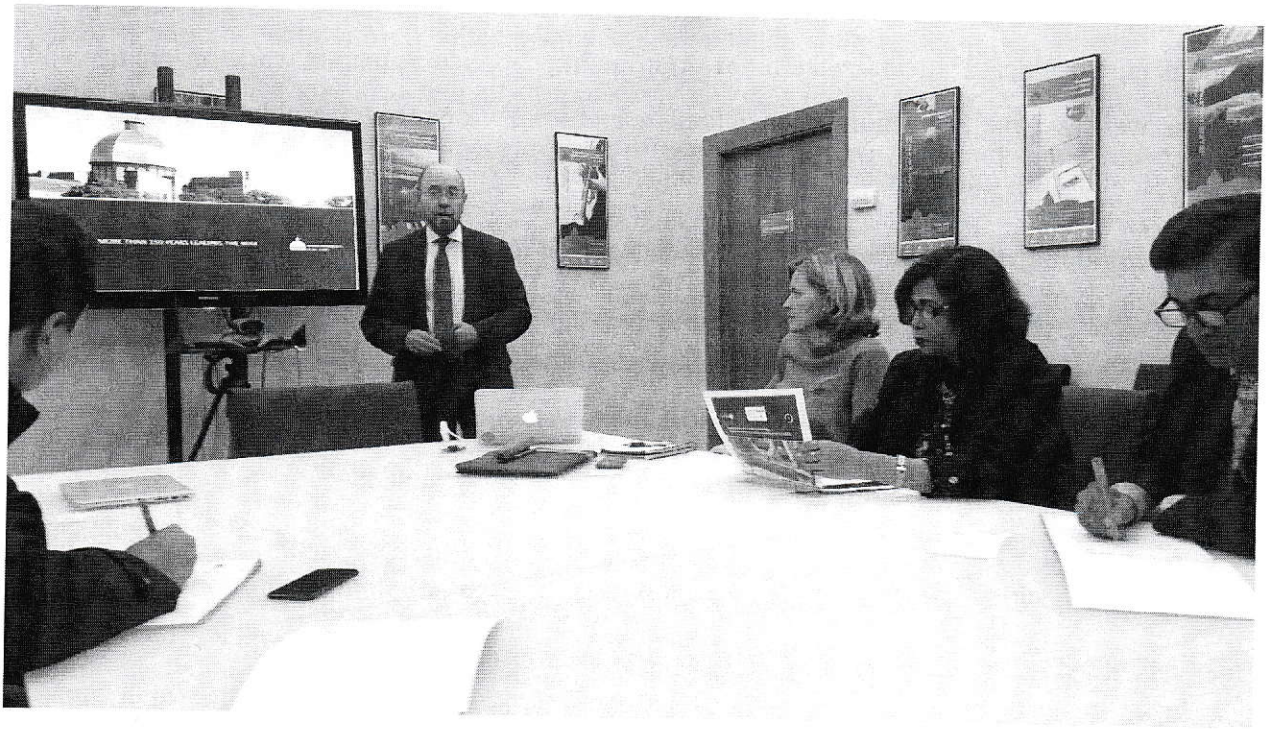
Visit to Higher Technical School of Industrial Engineers, Polytechnic University of Madrid

Brief Description of Institute for Research in Technology:

The Higher Technical School of Industrial Engineers (ETSII), whose origins go back to 1850, is a public institution dedicated to higher education and is a part of the Polytechnic University of Madrid (UPM). It aims to prepare high level professionals with broad capabilities to generate, integrate and apply scientific, technological and business knowledge in the industrial field, contributing to the economic and environmental development of society.

Meeting With the Representatives from Institute for Research in Technology:

The delegation had a meeting with representatives from Higher Technical School of Industrial Engineers on December 14, 2017 at 18:00 P.M. in Madrid, Spain. The team from ETSII was led by Emilio Minguez Torres, Director of ETSII.



The following discussions and consequent decisions were taken between the EPRC delegation and Higher Technical School of Industrial Engineers team:

(1) With 4,500 students, 300 professors, 790 researchers in R & D projects and exchange agreements with more than 140 universities around the world, ETSII is the leading industrial engineering school by experience, admissions demand, innovation and international projection. It embraces many sectors: Energy, Mechanics, Electronics, Robotics, Electrical Engineering, Manufacturing, Industrial Chemistry and the Environment, Organization and Materials. Among different Master's degree offered by the school only the following ones are taught in English language:

(a) Master's in Industrial Electronics

(b) Master's in Organization Engineering

ETSII also offers PhD programs in English language for the following areas:

(a) PhD in Sustainable Renewable and Nuclear Energies

(b) PhD in Organization Engineering

(c) PhD in Electrical and Electronic Engineering.

The ETSII team suggested to the EPRC delegation that EPRC can provide scholarships to promising young researchers on energy and power so that they can have the opportunity to carry out their higher studies on the aforesaid subjects at the Higher Technical School of Industrial Engineers.

(2) The Centre of Industrial Electronics (CEI) is a research center at the Polytechnic University of Madrid (UPM) created to generate knowledge and develop applications related to Industrial Electronics in cooperation with industrial partners. CEI activities focus on electronic system designs, both analog and digital. Research lines are related to power electronics, power quality and embedded systems. The Institute of Solar Energy of the Polytechnic University of Madrid (IES-UPM), whose initial works commenced during the late 70's of the last century, has been a pioneer center entirely devoted to photovoltaic conversion of solar energy. Through its great creativity IES-UPM is nowadays a worldwide recognized center which, despite being modest in size, has achieved leading contributions in silicon solar cells technology, III-V material cells, including multijunction, and more efficient new concepts for solar cells, including associated quantum calculations.

The ETSII team told the EPRC delegation that many internationally renowned research centers on energy and power have a collaborative agreement with the Centre of Industrial Electronics and The Institute of Solar Energy of UPM. The ETSII team also suggested to the EPRC delegation that the Universities carrying out applied research work on energy and power as well as energy and power research institutes in Bangladesh can have a similar collaborative agreement with the Centre of Industrial Electronics and The Institute of Solar Energy of UPM and in this regard EPRC can play a vital role.

Visit to Gas Natural Fenosa (GNF)

Brief Description of Gas Natural Fenosa (GNF):

Gas Natural Fenosa is the largest integrated gas and Electricity Company in Spain and the third largest distributor of gas and electricity on the Iberian market. The company is a market leader in gas distribution, serving more than 1,000 municipalities in nine autonomous regions, with more than five million customers. In its electricity business, Gas natural Fenosa is the third largest company in the country, where it provides service to 3.7 million customers, and has a major presence in a range of technologies: combined cycle, hydro, coal, cogeneration, wind and nuclear power plants.

Meeting With the Representatives from Gas Natural Fenosa (GNF):

The EPRC delegation had a meeting with representatives from Gas Natural Fenosa on December 15, 2017 at 09:30 A.M. in Madrid, Spain. The team from GNF was led by Ane Miren Arino Ochoa, Promotion and Development, Asia, India and North Africa, GNF.

The following discussions and consequent decisions were taken between the EPRC delegation and the GNF team:

1) GNF is focusing on its innovation efforts to develop and integrate technologies as well as introduce applications that improve different processes associated with the power networks and the "Smart Energy" concept. It has deployed cost effective solutions by using IoT equipment to monitor real time dynamic rating in overhead and underground power lines, partial discharge in underground cables and observe critical assets such as transformers and breakers. GNF has also developed and installed an advanced measuring infrastructure using intelligent meters with extended functionalities. The GNF team told the EPRC delegation that the Council should have Grid Modernization as one of their primary research focus area. A more dynamic grid system—one that could tell exactly how much electricity consumers are using and how much it is costing as they are using it, giving the utilities better decision-making power.

2) Gas Natural Fenosa is committed to innovations which will promote resource and energy efficiency, waste reduction, resource recovery and recycling, and the use of cleaner technologies. It has developed and introduced equipment for optimizing power in the installations of the end user and reduce effective CO_2 emission rates in electricity generation plants. The GNF team told the EPRC delegation that they are willing to provide necessary support to the Council with a view to taking forward applied research work in the fields of energy efficiency and responsible energy conservation in Bangladesh.

Visit to Institute for Research in Technology, Universidad Pontificia Comillas Madrid

Brief Description of Institute for Research in Technology:

The IIT, Institute for Research in Technology, belongs to the School of Engineering (ICAI) of Comillas Pontifical University of Madrid (Comillas). Its main aim is to promote research and

postgraduate training in diverse technological fields through participation in specific projects of interest for Industry and the Spanish Government. It is a non-profit Institute, which aims to be flexible and pragmatic in the way it works. It is essentially financed by projects contracted by companies, and thus responds to a clear social demand.

Meeting With the Representatives from Institute for Research in Technology:

The EPRC delegation had a meeting with representatives from Institute for Research in Technology on December 16, 2017 at 16:00 P.M. in Madrid, Spain. The team from Institute for Research in Technology was led by Thomas Gomez San Roman, PhD, Director of IIT.

The following discussions and consequent decisions were taken between the EPRC delegation and Institute for Research in Technology team:

(1) The team from Institute for Research in Technology mentioned that the IIT has a highly qualified team of researchers and professors, consisting of engineers, economists and mathematicians, able to support applied research work in different areas of energy and power. The research focus areas of IIT are:

(a) Energy Economics and Regulations

(b) Power Systems

(c) Smart and Green Networks

(d) Energy System Models

(e) Smart Industry and Cities

The EPRC delegation told the IIT team that most of the research focus areas of IIT are similar to that of EPRC. The delegation also suggested that EPRC could have a collaboration agreement with the Institute for Research in Technology to identify areas of cooperation for solving critical and emerging industry issues.

(2) The ICAI School of Engineering, Universidad Pontificia Comillas Madrid was founded in 1908. It has six departments comprising Mechanical Engineering, Power Systems, Electronic Engineering, Computer Science & Communications, Industrial Engineering and Applied Mathematics. The ICAI School of Engineering also have 29 labs for teaching and research and 250 faculty members. IIT's research teams make an important contribution to ICAI School of Engineering's ambitious and internationally oriented postgraduate as well as doctoral programs. The programs are given below:

- PhD in Power & Energy Systems
- MSc in Power & Energy Systems
- PhD in Engineering Systems Modelling
- MSc in Engineering Systems Modelling
- Joint PhD in Sustainable Energy Technologies and Strategies SETS (Erasmus Mundus)
- MSc in Electric Power Industry
- MSc in Electrical Technology

The IIT team suggested to the EPRC delegation that EPRC can provide scholarships to promising young researchers on energy and power so that they can have the opportunity to carry out their higher studies on the aforesaid subjects at the Comillas Pontifical University of Madrid.

22/8/16